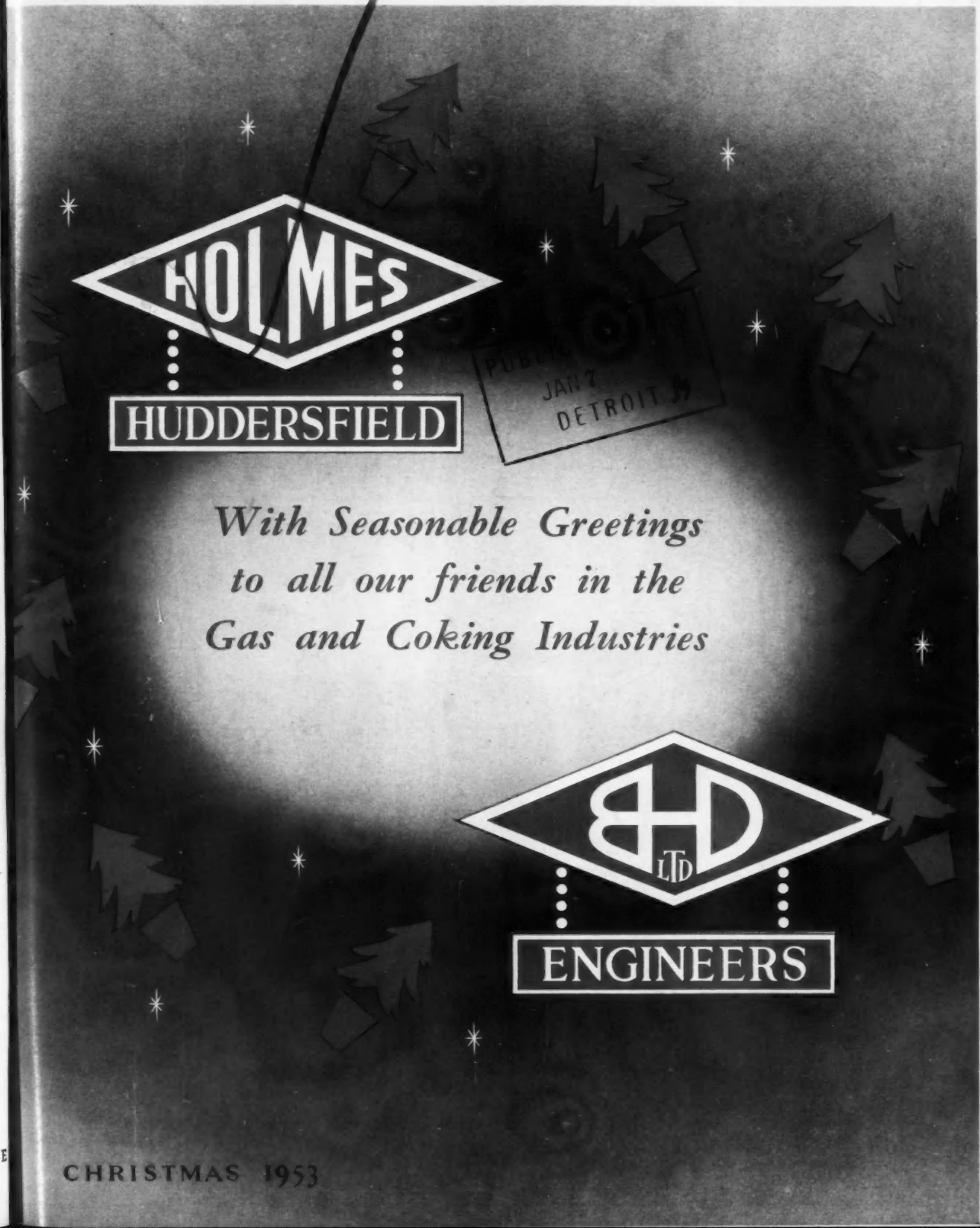
...NOLOGY DEPT.

Gas Journal

VOL. 276. 105TH YEAR. LONDON, DECEMBER 16, 1953. NO. 4724. PRICE 1/3



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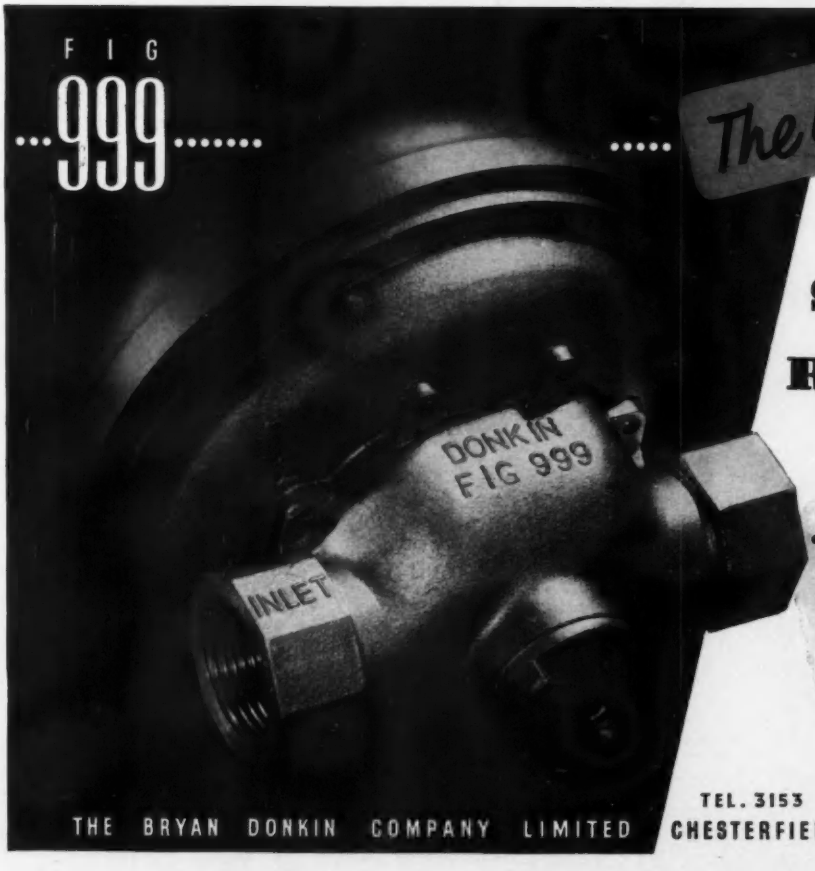

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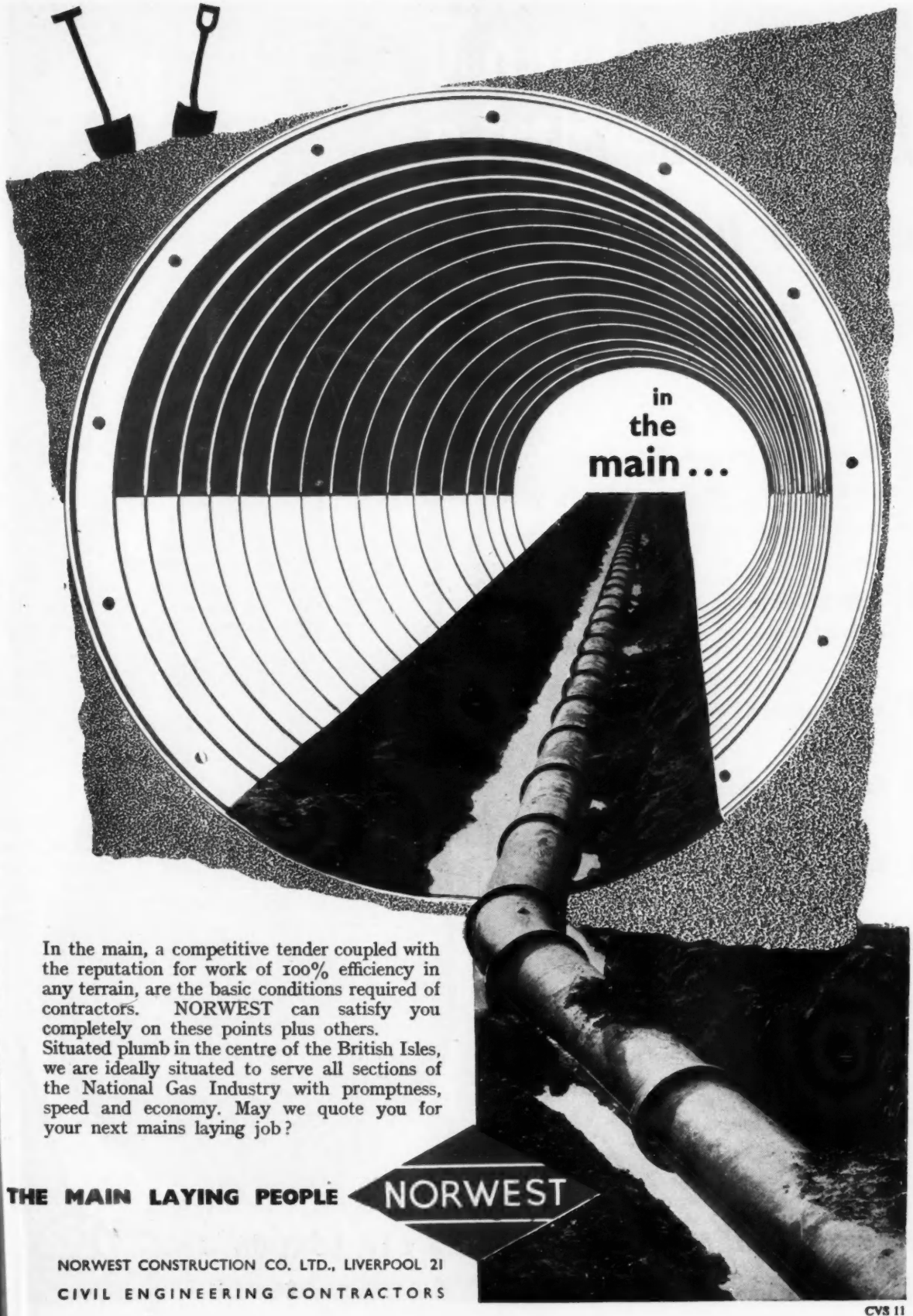

In the main, a competitive tender coupled with the reputation for work of 100% efficiency in any terrain, are the basic conditions required of contractors. NORWEST can satisfy you completely on these points plus others. Situated plumb in the centre of the British Isles, we are ideally situated to serve all sections of the National Gas Industry with promptness, speed and economy. May we quote you for your next mains laying job?

THE MAIN LAYING PEOPLE NORWEST

NORWEST CONSTRUCTION CO. LTD., LIVERPOOL 21
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A

I.C.I. Copper tubes ensure trouble-free Gas Systems

For domestic gas systems, light gauge copper tubes made by the Metals Division of I.C.I. have five obvious advantages. They are:—

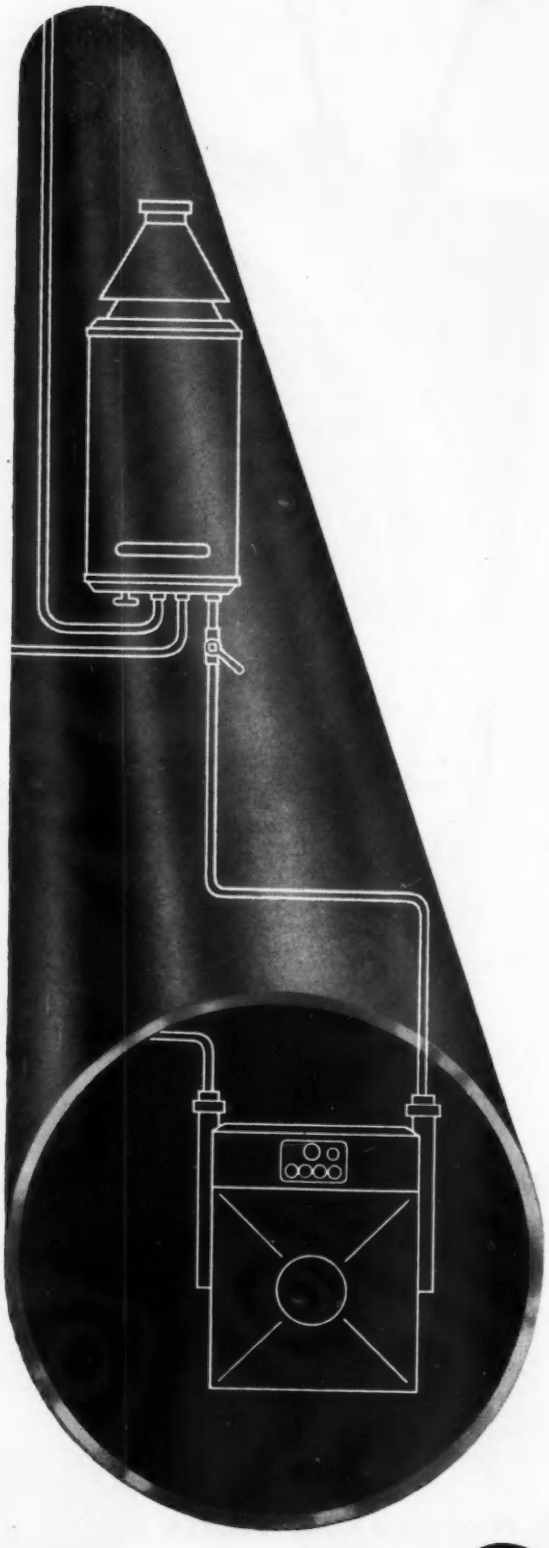
1 **Economical, both in laying costs and maintenance.**

2 **Not attacked by normal town gas.**

3 **Easily manipulated and installed.**

4 **Strong in relation to their light weight.**

5 **Neat in appearance.**



Whatever the building—farmhouse or factory; house, hotel or hospital—the job is better done with I.C.I. copper tubes.

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to festive cooking
Seasonal Greetings
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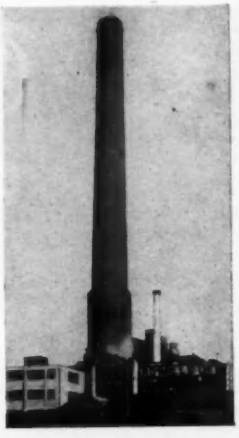
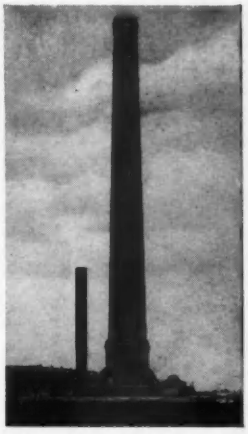
The successful completion of over 4 million feet of Bored Piling during the last fifteen years is an achievement which speaks for itself.

Left : Trial borings for reconstruction of Coventry Cathedral.





Two of the largest chimneys in the British Isles; on foundations of Francois Concrete Piles (left) and Francois Cementation Piles (Right).

Write for your copy of our new booklet about Bored Piling.

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fix it once . .

fix it for good

"Small" leaks cost you so much in wastage . . . and repeated repairs cost you so much in money . . . that the only practical repair is one that's permanent. A permanent repair is certain every time when you put on a Dresser Clamp. Clamping seals the joint with a resilient rubber gasket — provides a flexible repair to guard against future pipe movement, vibration and stresses which cause recaulked joints to leak again and again. It's standard practice to clamp all cast-iron socket and spigot joints near railroad tracks, on bridge lines, in unstable soil. Why not then make sure *every* repair lasts—why not "Fix it once—Fix it for good" the first time you uncover a leaking joint? The Dresser Style 60 is adjustable to fit standard pipe and most off-size pipe. Sizes are available from 3″ to 48″. Write today to the address below for descriptive literature and prices

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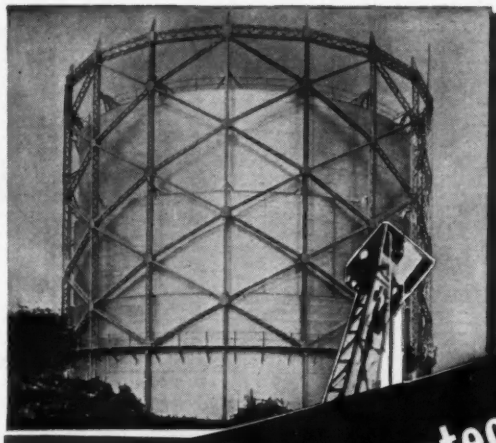
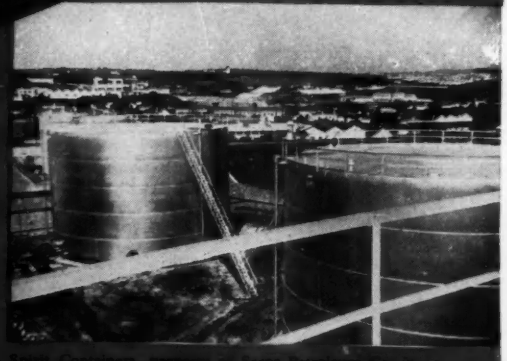


Gasholder in Kent showing brilliance of Atlas Ruskilla Aluminium Paint.

For the protection of metal structures



Spirit Containers, property of Esso Petroleum Co. at Fawley, coated with "Atlas Ruskilla" Aluminium Paint. High reflectivity of this paint reduces effects of solar heat and consequent loss of spirit by evaporation.

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10

'NOFLOTE' CONTROL

. . . applied to Automatic Bagging and Weighing Machine

In their new fully automatic Debreezing and Weighing Machine, used for weighing and bagging coke, Robert Cort & Sons Ltd., of Reading, have successfully incorporated "Noflote" Control.

The action of the machine is straightforward : coke is fed into a top hopper, passed through on to a debreezing screen, and fed to a small buffer hopper supplying coke to a weighing hopper via a vibrator feeder.

At a pre-set weight the weighing hopper drops, switching off a mercury switch, so stopping the vibrator feeder: the debreezing screen meanwhile still feeds coke into the small buffer hopper, which under normal circumstances would ultimately overflow. "Noflote" Control, however, regulates this screening and so maintains the quantity of coke in the small buffer hopper between two predetermined levels.

The level of the electrode is so arranged as to keep a sufficient supply of coke for the weigher until a fresh supply is delivered from the debreezing screen. When the level of the coke reaches the upper electrode this screen is automatically stopped; it restarts when the level descends clear of the lower electrode.

For further details of the varied applications of "Noflote" Controls, ask for publications G.J.051/60

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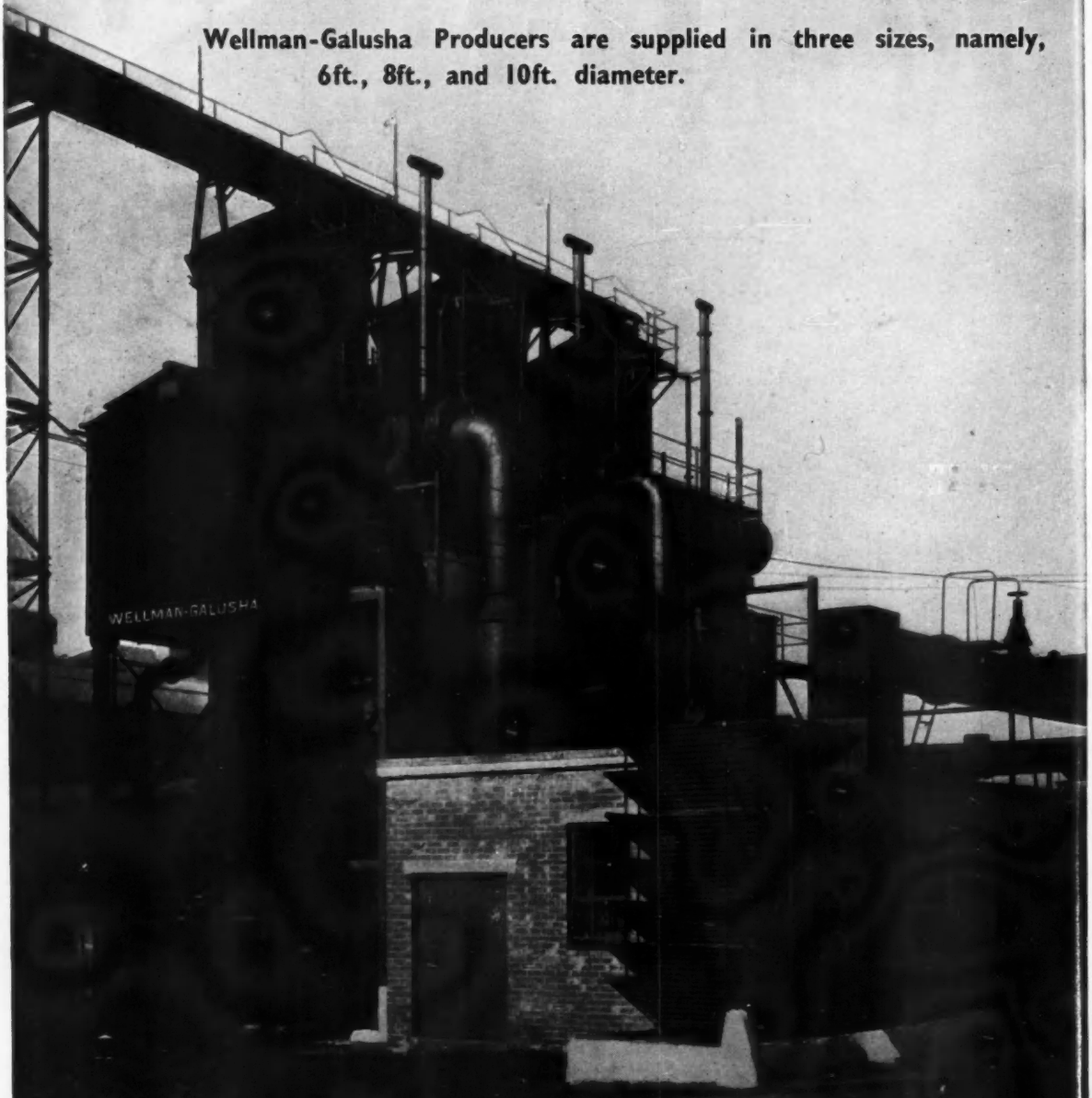
Wellman-Galusha Producers are supplied in three sizes, namely, 6ft., 8ft., and 10ft. diameter.



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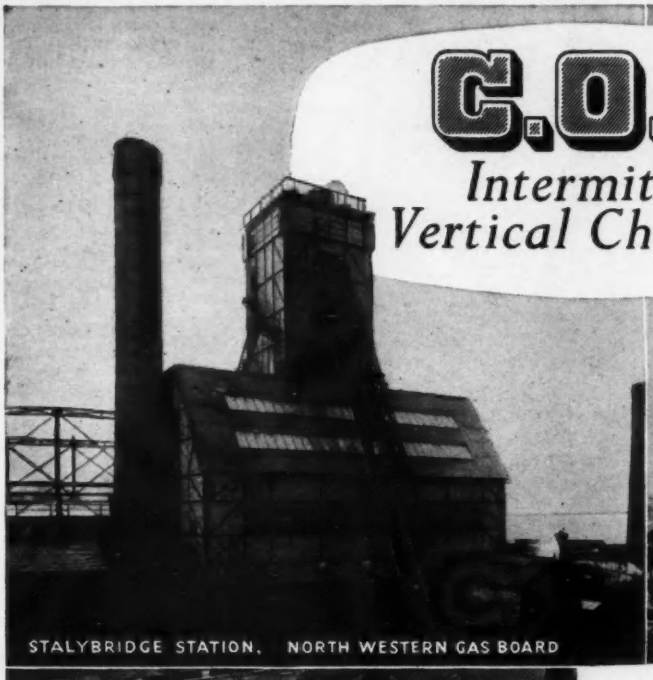

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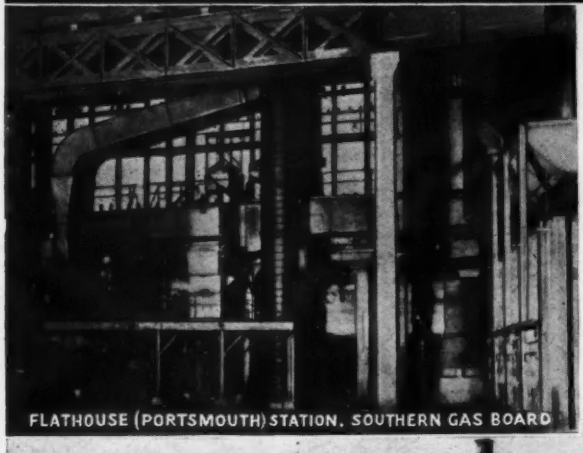

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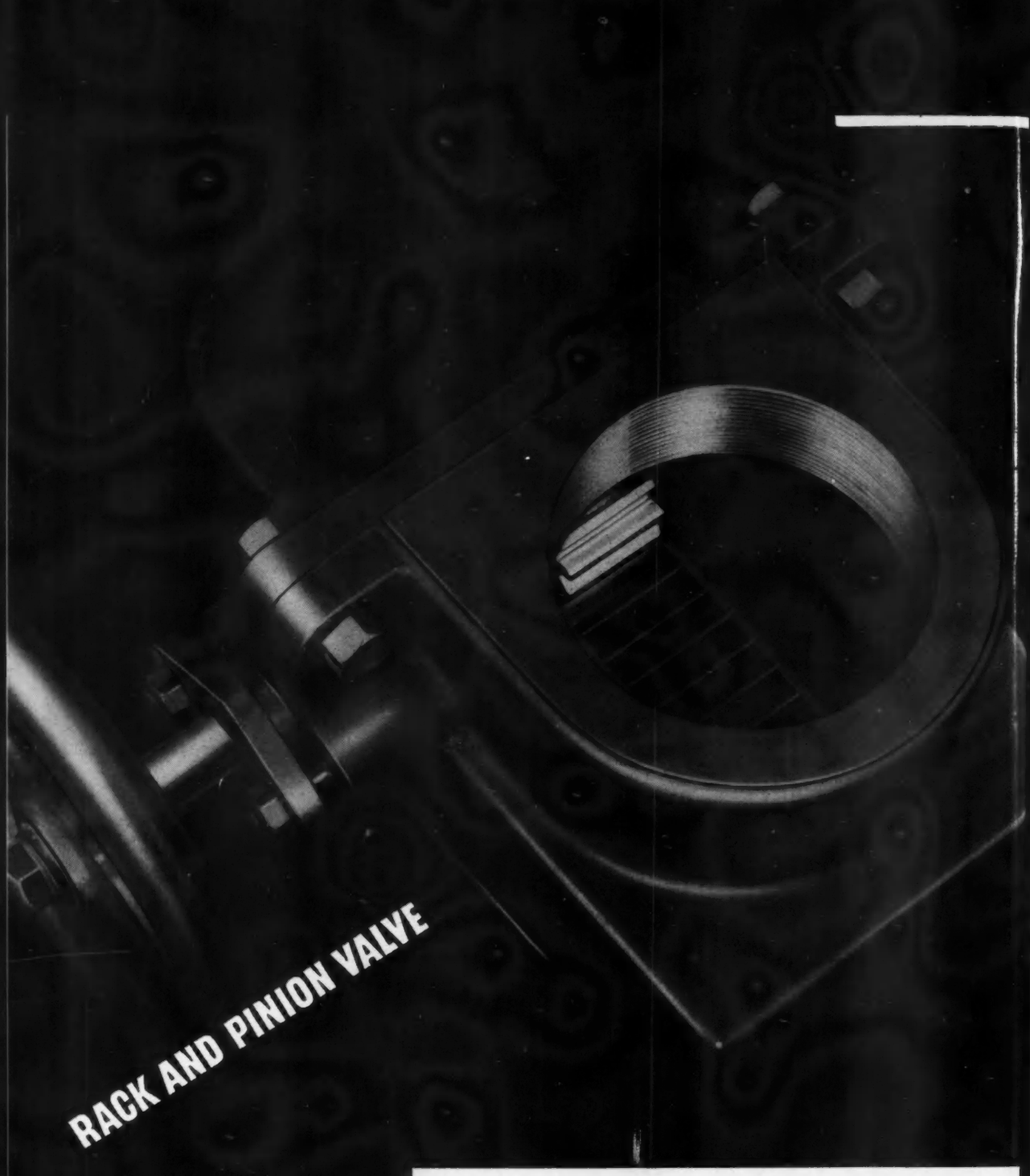
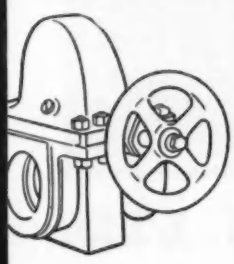


RACK AND PINION VALVE



Freer opening and faster shut-off. Pinion and buffers made from a specially selected grade of corrosion-resisting bronze. Action keeps body seating free from deposit. 2", 3" and 4" valves are available with screwed ends; above 4" with double flanged ends. Clockwise or anti-clockwise closing.

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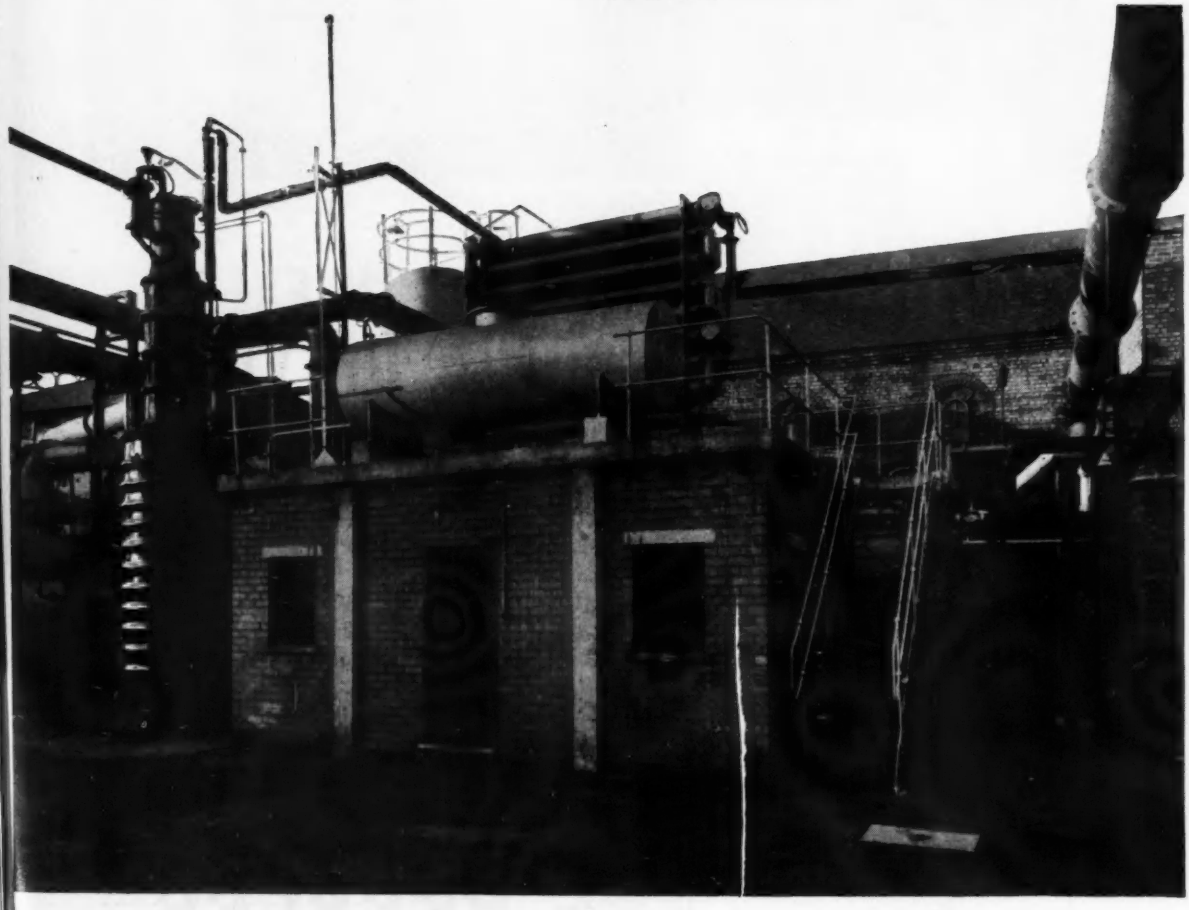
The photographs show a Wilton crude concentrated ammonia liquor plant built for the West Midlands Gas Board at Worcester. These plants are specially designed to allow of efficient operation at varying capacities up to the rated maximum, and to produce products of any strength from 18 to 25 per cent NH_3 by weight irrespective of crude liquor strength. When only free ammonia is recovered, operation is automatic without shift labour.

Complete plants can also be built for ammonia recovery as sulphate of ammonia.

Control room



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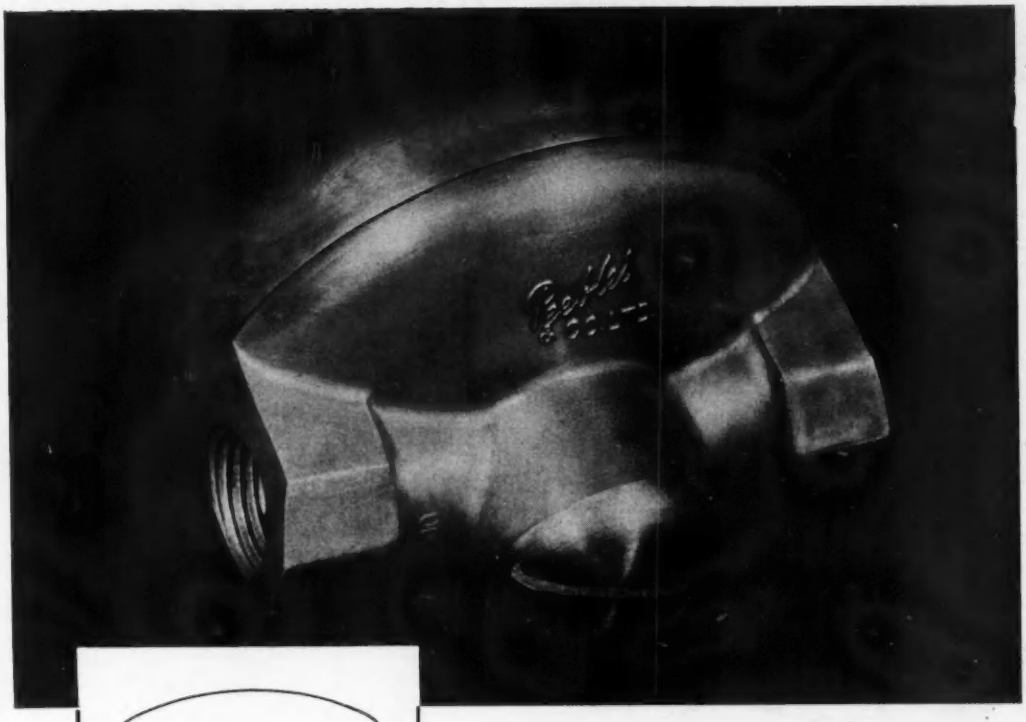

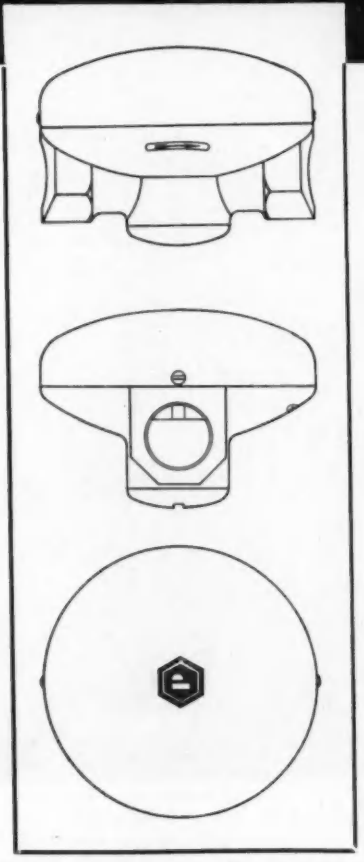

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The "Fig. 100" Appliance Governor is exceptional, not only in smooth exterior appearance, but also in its internal design, and its performance. Pressure die cast for close grained metal, designed and precision-made for stable performance and minimum maintenance costs, **it gives excellent response to every demand made upon it.**

Write for full particulars.

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The wind in the willows

A gentle craft, very much apart from the harsh hurly-burly of our scientific age, and yet the basket-makers' work is as important to-day as ever it was—be it 'skips' for actors, baskets for shoppers or hampers for picnics.

But the selection and preparation of the willows—from the time they are cut from the osier beds, through the weathering, stripping and plaiting, to the time the finished article is ready for dispatch—is a story of continuous skill, care and foresight—of selective rejection. Here is true craftsmanship of the same high order as the men who select, prepare and fashion the skins used in the famous 'Multitest' Gas Meter Diaphragms.

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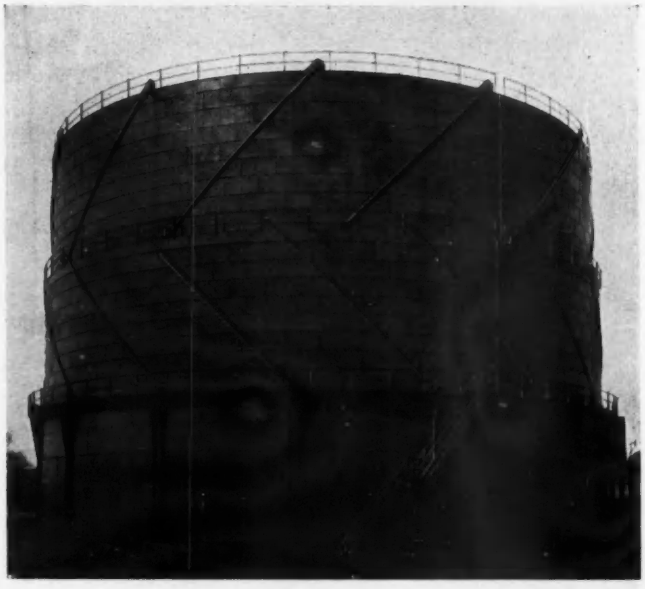

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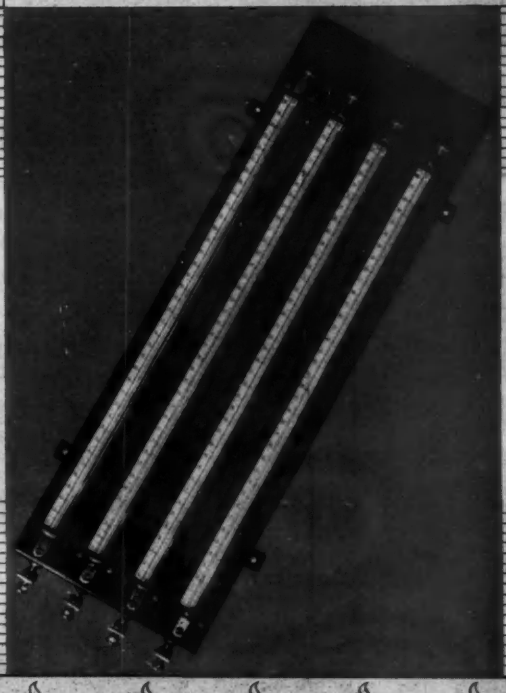

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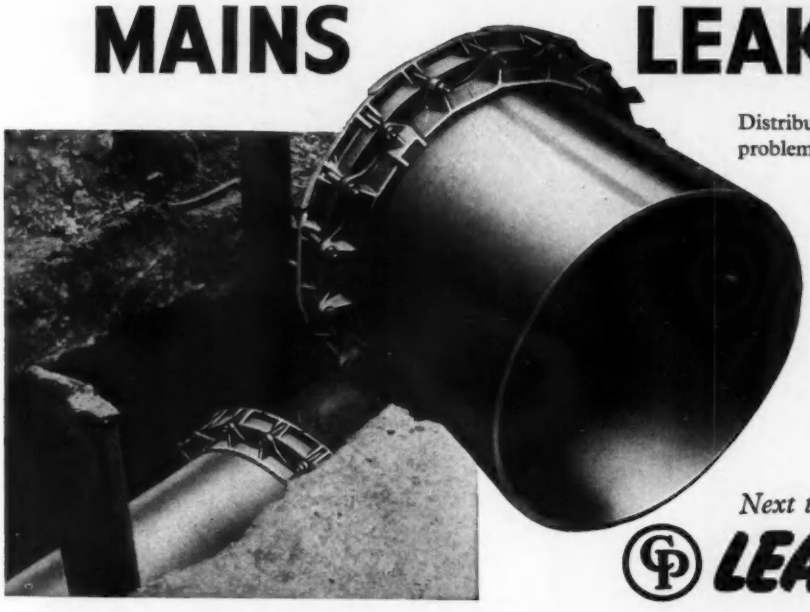
B

OVERCOME THE CAUSES OF MAINS LEAKAGE



Distribution Engineers are faced with many problems, not the least of which is 'unaccounted for gas', due to leakage from the joints of mains. Excessive vibration from modern heavy traffic, temperature changes causing expansion and contraction, the impermanence of ordinary caulking, higher gas pressures, etc., are some of the reasons.

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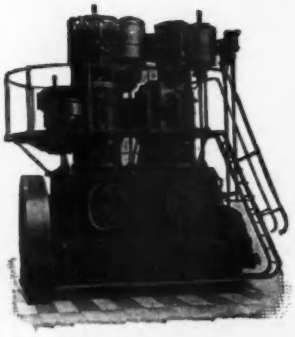

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Single Stage. Pressures up to 40 lbs. per sq. in.
Capacities up to 10,000 cu. ft. per min.

Two Stage. Pressures up to 120 lbs. per sq. in.
Capacities up to 5,000 cu. ft. per min.

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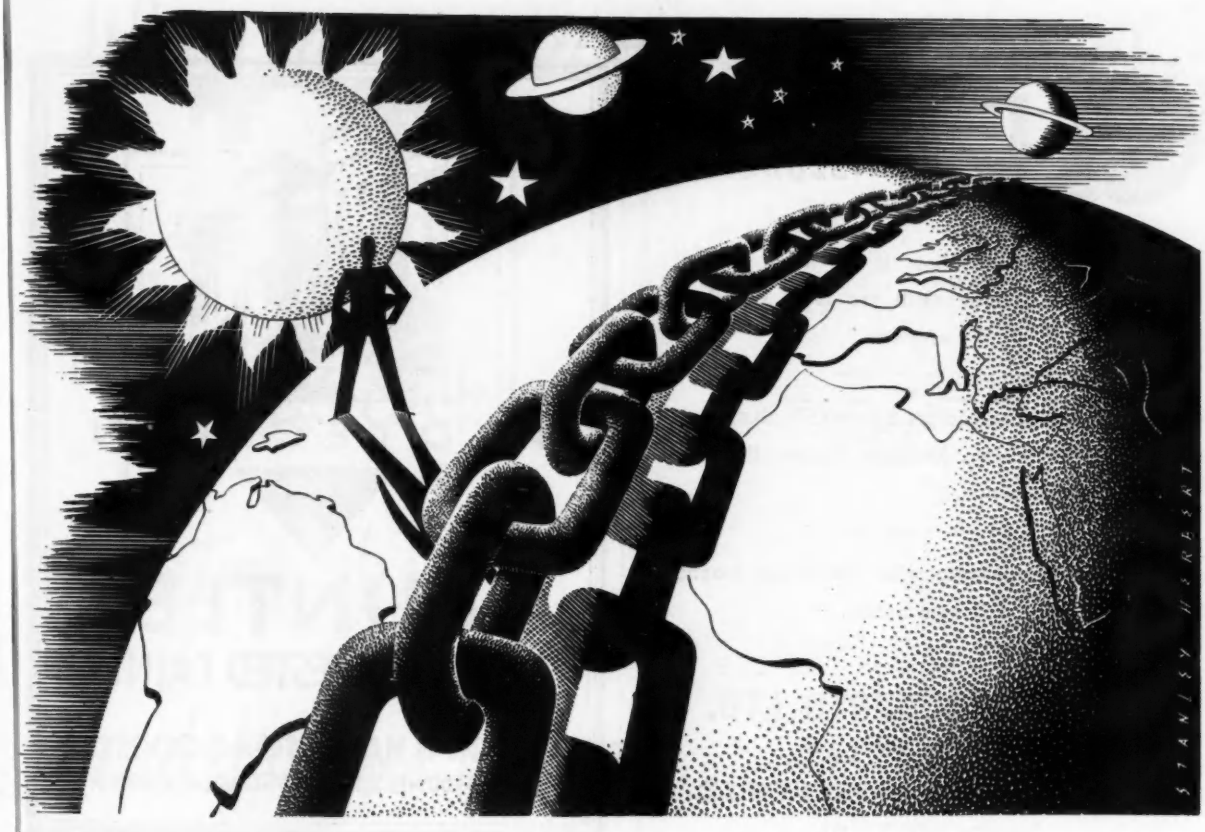
Telegrams: "Reavell, Ipswich." Telephone Nos. 2124 & 2125 Ipswich.



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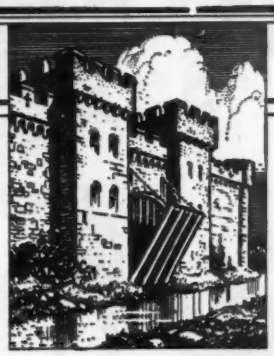

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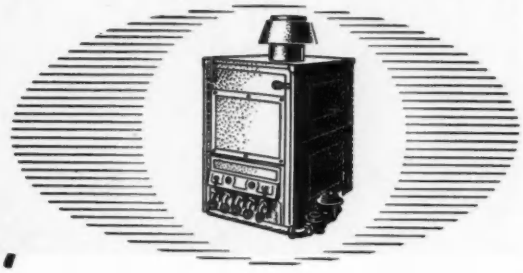

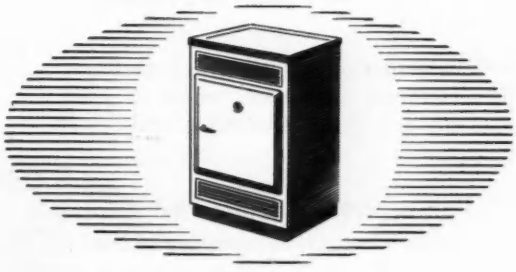

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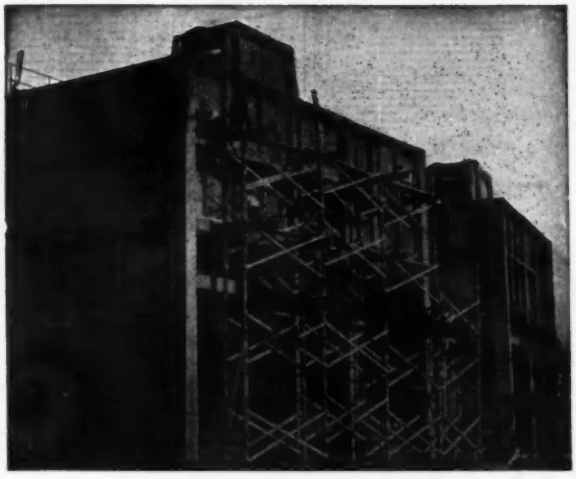

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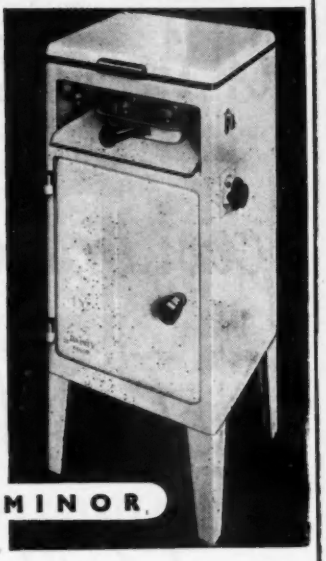

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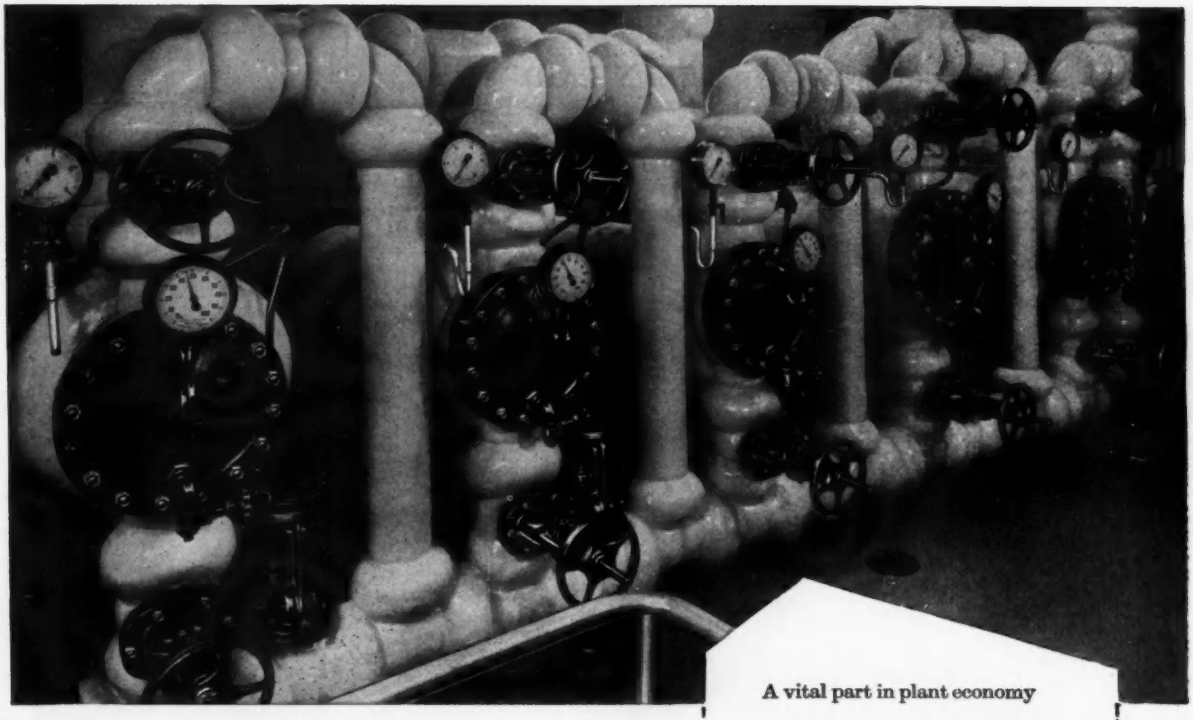

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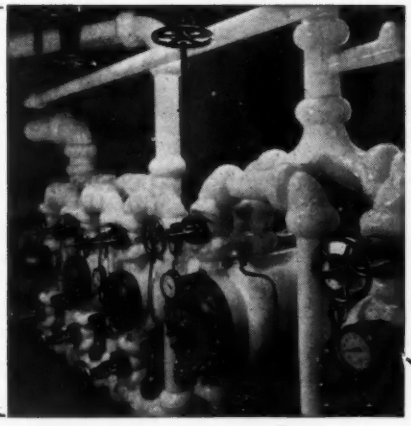

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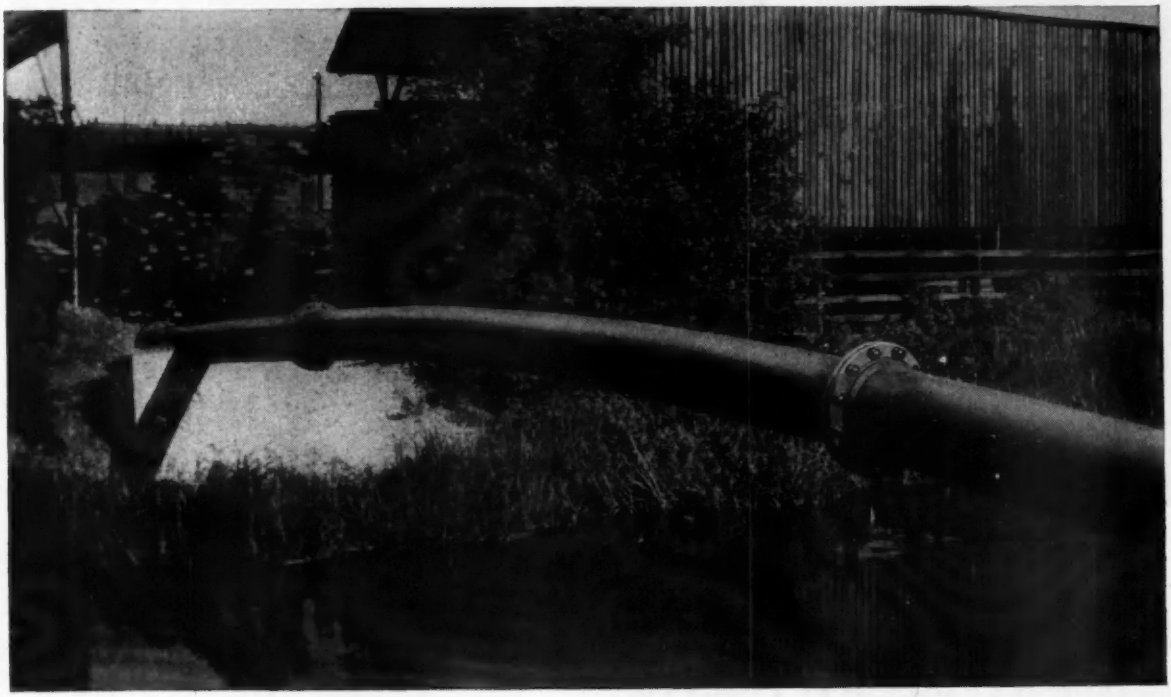

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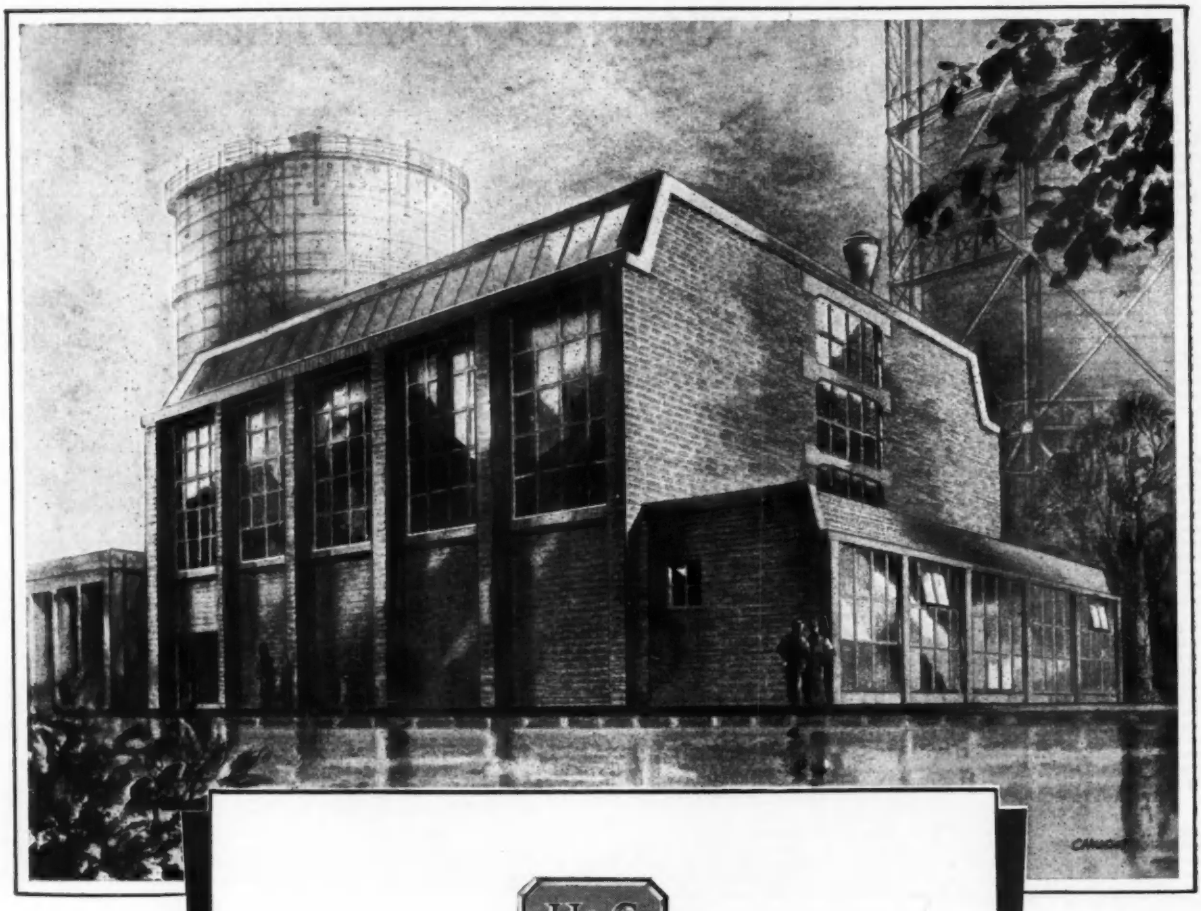

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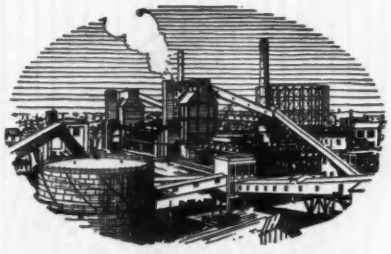

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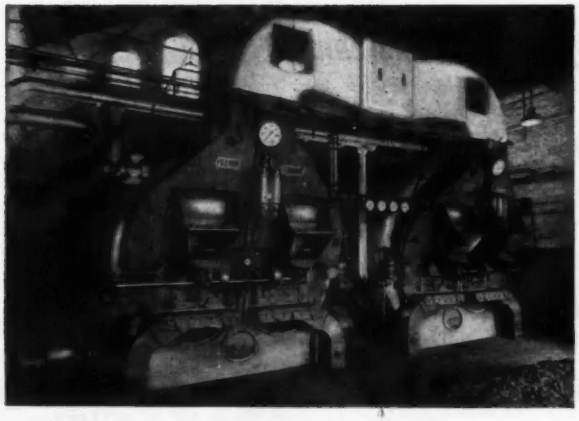

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' Integralgas '
(see p. 725)

GAS JOURNAL

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COMPLETE GASIFICATION

On later pages we publish an important article describing the G.I. system of complete gasification. Its basis is the fact recently announced in our columns that the Woodall-Duckham Company has acquired from the owners of this system the exclusive rights to offer plants in accordance with the process in Great Britain for a long period of years. Obviously such a decision, which is certainly timely, has not been arrived at without thorough investigation. Operation and working results of plants at Rome, Trieste, and Vierzon have been closely examined; and W-D are completely satisfied with the engineering soundness and the technical performance of these installations. Agreement has been reached between the North Thames Gas Board and the Company for the immediate erection of a demonstration plant of a capacity of 2 mill. cu.ft. of gas a day. It will be designed to treat a wide range of coals and to determine the upper limit of carburetting the gas for town supply. It will follow in principle the unit at Vierzon, which has given two years of satisfactory and reliable operation. Among the outstanding features of the W-D/I.F.E. plant, as it is designated, is that it operates at atmospheric pressure and does not require the installation of an oxygen plant. Another is that it can be constructed in units of one, two, or three million cubic feet per day, and multiples of these. In other words, the process is in no way confined to the ultra-large works. It is essentially flexible.

It is indeed this question of flexibility in gas manufacture which above all marks this new development —a characteristic which has been at the root of the strength of the gas industry in the past and which is destined to play a major rôle in future progress. As is emphasised in the article in our issue today—and the point was stressed during the research meeting of the Institution of Gas Engineers—there has been warning enough that the supplies of coal in this country which can be used in conventional gas-making plants are dwindling. The expansion of the hard coke industry will absorb an ever greater proportion of the better coking coals; the while the National Coal Board's plans for major expansion of production lie mainly in just those weakly swelling coals which have hitherto been least used for gas-making. The W-D/I.F.E. plant operates on high volatile coals having British Swelling Numbers of 3 and below. The production of coals of this class probably amounts to over 100 mill. tons per annum, and the majority of these coals are not at present suitable for treatment in existing forms of carbonising plant in this country. That is why we place such weight on this ' flexibility factor,' and why we were so interested in the comments of Mr. J. E. Davis at the Institution research meeting that many people are thinking in clichés, the two clichés being ' Two-fuel industry ' on the one hand, and ' All gas ' on the other, as if there were no room for both or combinations of the two. The point is that processes such as that described in today's ' GAS JOURNAL ' and those being investigated by the Gas Council can deal with types of coal which represent about half the total mined in Great Britain. The prospect opened-up is inviting and stimulating.

ELECTRONICS IN THE INDUSTRY

The impact of new ideas on the intellect always comes with something of a shock. The thought of electronics in the gasworks is no exception even though Mr. G. M. Rimmer (see ' GAS JOURNAL ' of November 18, p. 463) assures us that we are already using these devices, as in the rectifier, to a very limited extent. Mr. H. Moys had no doubt, and all will agree with him, that Mr. Rimmer presented the essentials of electronics in his paper to the Midland Section in terms which, probably elementary enough to the electrical engineer, achieved a high degree of intelligibility in the minds of his colleagues in the gas industry. We shall in time get over the frightful jargon. As Mr. A. Allen said, the author put his subject over in a charming and disarming way, using the word disarming intentionally. Indeed we must be careful about this ' disarming ' manner and not be lulled into thinking we understand much of this subject when as yet we understand very little.

Probably the most hopeful approach is by way of analogy with the relay with which we are familiar. The general purpose of the relay device is to enable very small forces, very readily controlled, to be amplified mechanically to actuate relatively heavy pieces of regulating mechanism. But in many instances the forces available are too small even to initiate such a train of operations. Electronics offer a means of dispensing altogether with the initial mechanical power, a complete absence of inertia, as Mr. Moys puts it, though Mr. Rimmer warns us that inertia reappears farther down the train. Mr. D. K. Green suggested an instance. Several attempts have been made to control the extractor gear of the continuous vertical retort by relay from the recording arm of the calorimeter. They broke down, generally because the force available in this arm is too minute to actuate mechanically any sort of mechanical relay. But here we seem to have in electronics such aids

as the capacity-sensing device which require no mechanical power at all to operate them.

Several other problems were suggested—an automatic control of temperature and moisture content in oxide purifiers, the measurement of sulphuretted hydrogen in purified gas, various types of governor, the determination of calorific value, distance controls in transmission systems. Probably the fact is that the gas engineer will learn to understand something of this complex and, to him, abstruse subject in ways roughly similar to that followed by the radio amateur. This persevering person builds himself wireless sets, at first knowing only vaguely what he is doing. Some of the sets work. Gradually he learns the elements of the art by trial and error. Finally he sets out with confidence to achieve the results he has in mind. Fortunately we shall not be in quite the same position. We shall pose our problems to Mr. Rimmer. He will solve some of them for us, and in his friendly collaborative way he will tell us what he is doing and we shall learn with increasing familiarity what has been done and finally what can be done. The very jargon will come to sound familiar to our ears. Already we are not terrified by the photo-electric cell.

Meantime Mr. Rimmer's reply to the discussion on the paper which he presented to the Midland Section of the Institution of Gas Engineers (see p. 735) will be studied carefully. In the first place these pieces of apparatus will be supplied and serviced by the manufacturers. Calorific control and throughput control seem to Mr. Rimmer to be relatively simple. Whether he will be able to co-ordinate these with the other factors in continuous vertical retort operation, as posed by Mr. Green, is not so clear. The measurement of sulphuretted hydrogen in gas appears also to be relatively simple. The use of the piezo-crystal for calorific value control was explained at some length, and no doubt in time we shall understand it. Maintenance costs need not be excessive.

The paper, following as it does his previous exposition of the principles of electricity applied to large-scale operations on the gasworks and running in parallel with the electricity supply industry, has placed the gas industry under a considerable debt of gratitude to Mr. Rimmer for his attempt to make a little more intelligible to us this ultra-modern subject of electronics in its application to industrial, and particularly gasworks, processes.

A MATTER OF PRINCIPLE

On vesting date the area boards inherited something more than gas manufacturing and distribution plant. They took over the tradition of an industry that had appreciated the work of its employees and had taken a tangible interest in their public and private avocations. The consultative councils were appointed to 'consider any matters affecting the supply of gas in the area'—a wide term of reference that might mean everything that an area board does, or fails to do. One thing many of the old gas companies did was to contribute to the expenses of officials who undertook high civic responsibilities, and the Gas Act clearly required the boards to treat employees no less favourably by reason of nationalisation, and to follow the customary practice of the former owners. When Alderman Darrell Rees, Engineer and Manager at Pembroke, became Coronation Mayor of that ancient borough eight of the nine members of the Wales Gas Board agreed that it would be fitting to give him a small grant—probably much smaller than he would have received from his former directors.

The consultative council chairman, however, objected 'on principle,' then took the matter to the council, who by a majority agreed with his objection, despite the fact that already, since nationalisation, the Board had made grants to other officials who had accepted similar honours. On another page we report a meeting of the council last week at which Mr. T. Mervyn Jones, Chairman of the Board, explained the circumstances and generously offered —contrary to the accepted rule of majority decision— to withhold a payment approved by all but one of his colleagues if the council, presided over by the one dissentient, persisted in its opposition. We have headed this comment 'a matter of principle'; we should have written 'principles.' The thousands of pounds which the Board must spend on development in the future may be of much greater importance than a grant of probably not more than £50 to an employee who has given much time and work for his fellow citizens, but we still doubt whether the attitude taken by the consultative council after hearing only the 'minority' view of the Board as represented by the sole dissentient, does in fact reflect the view of the consumers it represents. The major matter of principle that arises out of this unfortunate affair is the question of whether it is right that one member of a board of a nationalised industry, when outvoted by all his colleagues, can get his own way and so hold his colleagues to ransom by taking the matter on which he dissents to the public consultative council of which he is chairman.

CALENDAR AND DIRECTORY

Distribution began on Monday of the 1954 edition of the 'GAS JOURNAL' CALENDAR AND DIRECTORY. All advertisers in the 'C. & D.' and all 'JOURNAL' subscribers may therefore expect to receive their copies within the next few weeks. Additional copies will, as usual, be available at 25s. post free. The directory information has been revised to cover all changes notified during the past 12 months, and in addition to particulars of the Institution of Gas Engineers, district sections, junior associations, and kindred organisations, the 1954 edition contains for the first time complete lists of the members of all the Institution's district sections and the affiliated Irish and Scottish Associations. While every effort was made to achieve accuracy at the time of passing the final proofs there have been inevitable changes since we went to press. These include those listed in the 'JOURNAL' of December 2, and readers who desire to keep their copies up to date should note those alterations, although they will find that the relative page numbers in the 1954 edition are slightly different from those in the 1953 issue.

We shall follow our usual practice during 1954 of recording alterations in the first issue of the 'JOURNAL' in each calendar month, the first list being due to appear on January 6.

THE General Electric Co., Ltd., has produced an illustrated booklet recording the firm's contributions to public and royal occasions over 67 years, with views of public illuminations, royal visits to G.E.C. works and installations, an impressive range of plant installations, and notes on the expansion of the company throughout the six reigns.

THE British Thomson-Houston Co., Ltd., has announced a 10-year programme for the expansion of its turbine business. The programme involves extensive re-equipment and reorganisation of the Rugby turbine plant, and the erection of a new factory at Larne, Northern Ireland. The new factory will concentrate on the manufacture of large turbo-alternators of 30,000 kW and upwards, and will adjoin the turbine-blading factory already under construction by the Northern Ireland Government. Manufacture of turbo-alternator sets below 30,000 kW, gas turbines, marine main and auxiliary equipments, compressors, etc., will continue at Rugby on an increased scale.

Personal Notes

MR. J. E. GRAY, who recently gave up the Secretaryship of the London and Southern Junior Gas Association, was elected a member of the Council of the Junior Institution of Engineers at the annual general meeting on November 27.

MR. E. K. RICHMOND, Deputy Secretary and Solicitor of the South Western Gas Board, has been appointed Secretary of the Yorkshire Electricity Board. Before joining the staff of the South Western Board in 1951 he held appointments as Senior Assistant Solicitor, Gloucestershire County Council, and Assistant Solicitor, Cheshire County Council.

MR. BERNARD GAUGE, of the accounts department of the Cambridge undertaking, Eastern Gas Board, has retired shortly after completing 50 years in the gas industry. To mark the occasion and give practical expression to the congratulations and good wishes showered on Mr. Gauge, presentations were made by the General Manager, Mr. J. Hunter-Rioch, before a large attendance of colleagues and well wishers. The presentations consisted of a clock from the staff at Divisional and District offices, and a wallet from the Recreation Club.

MR. W. HOE, formerly representative in the West Midlands area for Radiation Group Sales, Ltd., Gas Division, retired from the service of the company on October 31. Mr. Hoe joined Arden Hill & Co. in 1915, as representative for the Lancashire ground and, in 1919, he took over the West Midlands area. At a gathering of Directors and colleagues of the Sales Staff at the Warrington Production Centre, Mr. F. A. Hooper, Managing Director, Radiation Group Sales, Ltd., presented him with one of the new 'Eighty Four' cookers and a cheque. MR. C. G. S. ROLLS, of the Radiation Technical Service staff, has succeeded Mr. Hoe as Sales Representative, West Midlands area.

MR. K. L. MORTIMORE, A.C.A., Manager of the Hornsey District of the North Thames Gas Board, retired from the Board's service as from November 30. In his place the Board has appointed MR. J. F. DORAN as Local Manager, Hornsey District. The district, while retaining its name, will for commercial purposes work as a unit of the Board's Northern Division. On the production side, no change in responsibility is involved since Hornsey works is already within Group 3. MR. P. G. S. FRY will have the title of Station Engineer, Hornsey. Mr. Mortimore was associated with Hornsey for 28 years, having joined the old Hornsey Gas Company in 1925 as Secretary, and in 1932 became General Manager and Secretary. Previously to 1925 he had a spell of two years in the Accountants' Department of the Gas Light and Coke Company. Mr. Doran has been with the North Thames Board for 18 years, working first in the research laboratories at Fulham, and then as a service supervisor at Edgware Road, Kilburn, Westminster, and Walham Green. He was the Board's first employee to be nominated for the Institution of Gas Engineers Course of Management Training. During the last war, Mr. Doran served as a pilot with the Fleet Air Arm. Mr. Fry has been in charge of production at Hornsey works since 1947. Previously he was with the old Commercial Company, and altogether has been in the industry for 34 years.

DR. P. H. SYKES has been appointed a director of the British Oxygen Company.

MR. J. E. T. WATSON, Sales Manager for the Chaseside Engineering Co., Ltd., since 1948 until recently, has joined F. E. Weatherill, Ltd., manufacturers of hydraulic loading shovels, in a similar capacity.

Obituary

MR. WILLIAM SCOTT, Hamilton District Engineer, of the Scottish Gas Board, has died at the age of 51. He was a native of Cowdenbeath, Fife, where his father was gas manager. Mr. Scott was previously at Alloa and Tillicoultry. He went to Hamilton in 1934 as assistant manager to the late Mr. J. B. Ferns, and was appointed district manager in 1951. He is survived by his wife.

MR. G. J. CLARK, who retired in 1932 after more than 40 years with the Gas Light and Coke Company, died on November 20, aged 74. At the time of his retirement he was Manager of the Research and Training Section at Watson House, and was, in fact, regarded as the founder of that establishment. In his History of the Gas Light and Coke Company, Stirling Everard wrote: 'The foundations (of the research and training centre) had been laid in 1903, for with gasmaking at Pancras works about to end, Mr. J. G. Clark (a distant relative of Joseph Clark, sometime Chief Engineer of the Imperial Company), who was a chemist there, received permission from Thomas Goulden to devote some of his time to the study of district problems at Westminster, particularly in relation to water heaters which were then rather troublesome appliances. The work, which was undertaken on his own initiative, proved so valuable that he was allowed to continue and expand it, and he co-operated with the officers responsible for the training of apprentices. Now what had begun as a small venture became a project of great importance to the Company, and in 1923 Mr. Clark was officially appointed "Chemist, Gas Sales Department," and developed over the next few years the organisation which became known as Watson House.' After leaving the Gas Light and Coke Company, Mr. Clark went as a Technical Adviser to the old British Commercial Gas Association, remaining there for seven years. He was one of the earliest members of the Illuminating Engineering Society and a founder member of the London and Southern Junior Gas Association, later becoming one of its Presidents. His son, Mr. L. J. Clark, now Joint Deputy Station Engineer at Beckton, was President of the same Association in 1948.

WALTER A. BARNETT

G. le B.D. writes: In the early hours of Friday morning, December 4, Walter Barnett passed over and left us with a fine example of courage and endurance. Given up by the doctors some 20 years ago he managed to persuade the late Sir David Milne-Watson to give him a job with the South Eastern Gas Corporation and he was appointed to the former Mid-Kent Gaslight and Coke Company. He set about his new task with energy and remarkable practical ability—there was literally nothing on or about a gas undertaking that he could not do with his own hands and often did. He soon had the Mid-Kent undertaking in good shape and greatly extended its sphere of activity. In the dark hours of February 21, 1941, he rose to the summit of his powers when a mine, intended for the River Medway, fell on his works and laid them in ruins. In nine days some gas was being made, and in an incredibly short space of time full gas supply was restored. For this outstanding work he was awarded the M.B.E. Devastated by recurring attacks of the most serious illness, he lived by sheer willpower and endurance and contrived to pack into each day an unbelievable industry. A keen cricketer, an amateur chrysanthemum enthusiast of no mean ability, devoted to his beloved Kent, Walter Barnett was a likeable man and something of a character. It may be said of him after Montaigne:—

'Oh God! Thou mayest save me if Thou wilt and if Thou wilt Thou mayest destroy me: but whether or no I will steer my rudder true.'

Correspondence

SURFACE COMBUSTION

DEAR SIR,—Mr. Docking seems a little cross with me—otherwise I am sure he would not have used such expressions as 'Mr. Minchin confuses the problem of entraining air. . . . .' and later, 'his remarks on flash-back do not bear too close an examination.' I seem, Sir, to have spent a good deal of time during the past 25 years in the elucidation of these two phenomena, and I certainly thought my views (as expressed, for instance, in my paper to the Institution of Gas Engineers in Autumn, 1947) met with fairly general agreement. Mr. Docking did not intervene in the rather full discussion on that paper, nor indeed do I recall him ever before entering into any theoretical debate on the subject. Some more constructive criticism would, however, be welcomed.

The short article published in your edition of November 25 was not intended to treat with the theory of burners except by way of introduction to the Schwank burner, and if there are any other readers who, like Mr. Docking, find my remarks misleading, I hope they will go back to my more thorough expositions.

I am truly sorry if I seemed to imply that the porous bricks of a Radiant Heating surface combustion burner were liable to clog. It can hardly be gainsaid, however, that in a very dust-laden atmosphere the cylindrical apertures of the Schwank burner plate will be less easily blocked than the smaller and more irregular pores in a surface-combustion brick.—Yours faithfully,

LESLIE T. MINCHIN.

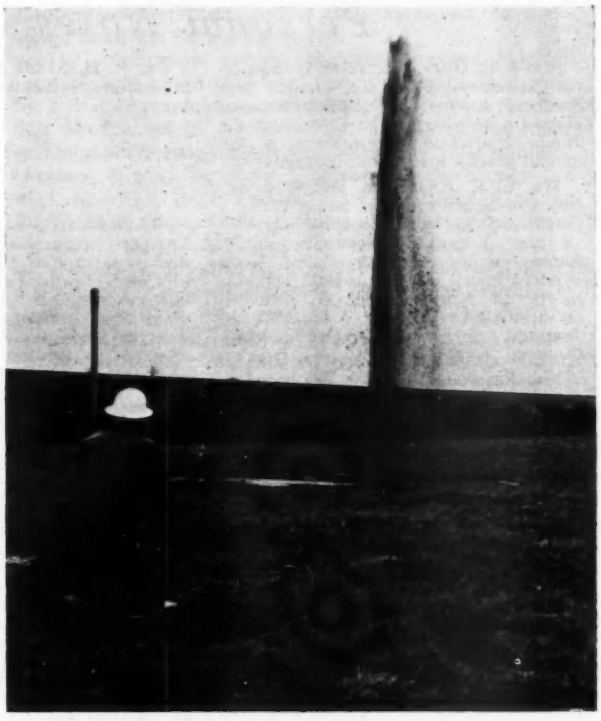
25a, Thurlow Road,
London, N.W.3.
December 11, 1953.

NATURAL GAS

FIRST SHOTS FIRED

Explorations Commence near Whitedale

FIRST explorations in the Gas Council's £1 million search for natural gas, which will extend over the next five years, are now taking place in the East Riding of Yorkshire. A seismic survey, which investigates the nature of the underground rock structure to determine whether supplies of natural gas are likely to be found in the area, is proceeding on a line from Aldbrough to Market Weighton. These photographs were taken in a field near Whitedale station about six miles inland from Aldbrough. The rock structure is measured by firing a charge of dynamite in a shot hole drilled to a depth of about 60 ft. to 70 ft. The seismic waves are reflected from the various rock structures and picked up by sensitive instruments, known as geophones, placed in the ground at fixed intervals along the line of the survey. By comparing the results obtained on the different instruments the nature of the structure can be calculated.



Above (right): *A shot firer explodes the dynamite by operating his plunger and as the shot is fired, mud and soil is blown 50 ft. into the air.*

Right: *A general view showing the portable derrick equipment.*

Geophones being set in the ground and connected to the cable in order to pick up the seismic waves and convey them to the recording unit.

The machinery which records the waves as received by the geophones and produces a photographic print showing the recording from each instrument.

Mr. John Shelley, who is in charge of the seismic survey party on the spot (left), chats to Mr. J. Bell, of the B.B.C., as a recording is made.

RESEARCH

This week we continue the series of articles by 'Gas Journal' Observers who attended the various sessions of the RESEARCH MEETING of the INSTITUTION OF GAS ENGINEERS. The whole ground of the proceedings, with reference to the discussions on the papers and reports, is being covered concisely by way of abstract and comment. For those interested in specific problems and particular features there are, of course, available the 'blue-books' of the Institution and of the Gas Council.

Gas Council Research

PLEASANTLY anticipated was the session of the research meeting of the Institution of Gas Engineers devoted to presentation and discussion of the Report on Research at the London and Birmingham Stations of the Gas Council; and in the event the session proved convincing and encouraging. A picture of the organisation and objects of the London Research Station was given by Dr. R. H. Griffith, and Dr. F. J. Dent outlined the work and aims of the Station at Birmingham.

As Dr. Griffith explained, the activities in London are shared by the Fulham Laboratories, with a staff of 94, and the Watson House Laboratories, with a staff of 104. The combined objectives of the research department are simply stated—to study the basic chemical and physical processes of gas manufacture, purification, and use in the provision of heat services; to develop new processes, products, and appliances; and to improve existing methods, products, and equipment. The work covers a wide range of subjects in the manufacture, purification, and utilisation of gas. The subjects range from coal carbonisation at the one end to the combustion of gas in the appliance and the disposal of the combustion products at the other end. Certain of the problems are new; some, such as the disposal of effluents from gasworks, are very old friends. And apart from old problems and new problems, there arises, as a result of new knowledge, skills, and techniques in other branches of science and technology, need for further research into questions which have been 'solved.' Hence the very great importance of collaboration with other research organisations.

In the sphere of gas manufacture, investigations are continuing into the effects of retort taper on the efficiency of carbonisation in continuous vertical retorts. The production of peak-load gas by a continuous process based on the interaction of oil and steam is being examined. Two new types of purifier are being installed on the pilot-plant scale. The application of the catalytic process for the removal of organic sulphur compounds from gas is being developed. The Koppers liquid purification plant for Beckton is being built, and experimental work on some of the related processes goes on. These are a few items only in the research programme on gas manufacture, which, as we have stressed, is linked with research on utilisation of the resultant products, including coke. How right Dr. Griffith was at the I.G.E. meeting when he said that it is no use for people in one research sector rubbing shoulders generally with nuclear physics if they are content to dissipate their efforts by using gas wastefully through lack of application of scientific study in the utilisation field.

Certainly the responsibility of a research department does not end when results are recorded in a laboratory notebook. New information should be properly applied or distributed to all those who can make use of it. The type of work published naturally varies from that describing fundamental studies to that dealing with a purely technological matter. Publication of results of original investigation is important for many reasons, particularly because it ensures that a high standard of work is maintained and leads to discussion with those occupied in experimental work in other industries and research organisations. We would add, however, that commonsense and restraint should be exercised in such publication of results. Brevity in expression has seldom been associated with published scientific thought; gas industry publications have, so far, provided no exception to this uneconomic norm.

Turning to the activities at Birmingham, this G.C. Research Station was given the task, among others, of investigating the utilisation of weakly-caking coals for gas manufacture. The subject was not new, but the transfer of the work from Poole to Birmingham brought a sense of urgency. This, as Dr. Dent explained at the meeting, was difficult to escape at a time of increasing prices, anxiety about coal supplies, and some undoubted deterioration in coal qualities. The significance of the work itself had increased following the opportunities presented by nationalisation. The urgency appeared all the greater when seeing plants being erected for operation over the next 40 years and when statements were being made that in some localities coal gas was little if any cheaper than carburetted water gas made from a prepared fuel, coke, and a relatively high-priced material such as gas oil. The feeling was that processes for the gasification of coal must be removed from the research laboratory so that the direct interest of engineers could add impetus to their development. Circumstances seemed to call for a minimum of delay in the recognition of processes which could be considered for immediate installation.

The Lurg Pressure Gasification Process

The first thing, therefore, was to take stock to see how far this was a possibility. It seemed that the time was ripe. There was news from Germany of a method of overcoming the caking difficulties when using bituminous coal in the Lurgi process of pressure gasification, a process which meets so many of our requirements. The one outstanding problem was that the calorific value of the gas was too low, but this could be remedied by the catalytic synthesis of methane which had just been taken through the pilot plant stage under the Gas Research Board. Here was a possible combination; and, as confirmation, arrangements were made to carry out tests in Germany with various types of British coal. These tests were successful. All the coals—and they varied from types Nos. 702 to 902—gasified smoothly without channelling in the fuel bed.

As for operation, it is difficult to convey how the plant combined the quality of stability with an extreme flexibility governed only by changes in the supplies of oxygen and steam. With steady supplies, there was an equally steady output of gas, no matter which of the coals was charged. The ash could vary up to 30%, the moisture up to 20%, and the size of coal down to one-eighth of an inch. On the other hand, while the gas quality was maintained, the output fell immediately and in proportion when the supplies of oxygen and steam were halved.

This year's report puts on record the operating data for some of the tests, including those in which the rate of gasification corresponded with an output of 7.5 mill. cu.ft. per day from 8 ft. 6 in. diameter. Measurements applied only to the generator, but, taken in conjunction

with data for oxygen production, purification, and methane synthesis, they indicate an overall thermal efficiency of 60% for everyday working.

These tests represent an important step forward, but, from the short-term view, there was one feature of the Lurgi process which could prove difficult in some circumstances—namely, the need for a large installation. Along with the engineers of the North Thames Gas Board, the research workers at Birmingham were impressed by the advances which had been made in processes based on the blow-run cycle which, though needing graded coal and using oil for enrichment, are not limited as regards minimum size of installation.

Two Complementary Processes

There were therefore these two complementary types of process available, and the fact was of immediate value in crystallising the research programme. Preliminary examination had indicated that, in certain localities, the cost of gas production would not appear unfavourable but, plainly, much could be done towards the establishment of processes relatively new to this country. Work in this category therefore takes priority. For example, for the cyclic type of process, considerable gains appear to be obtainable in both efficiency and output by preheating the air as well as the steam supply. They will be all the greater when using coal as generator fuel. For pressure gasification, in addition to methane synthesis, there are several possibilities discussed in the report.

Of these, in Dr. Dent's view, none seems likely to be more fruitful than a greater use of the hydrogenation reaction. The formation of methane in the fuel bed is appreciated as an important feature of the Lurgi process, but the calorific value of the gas produced is still only about 400 B.Th.U. per cu.ft. Synthesis of methane over a catalyst meets the immediate requirement for an increase to town gas standards, but if enrichment were by hydrogenation there would be an increase in the gas yield as well. The hydrogenation process is not yet fully worked out, but the experiments at Poole have indicated that if it were added as a separate stage to pressure gasification, gas of 600 B.Th.U. could be produced and the gas yield doubled without using any more steam or oxygen.

Such a hydrogenation stage would have a residue of coke—a very reactive coke—and the system would no longer be one of complete gasification. It is somewhat Gilbertian, as research so often is, that, when investigating the possibilities of coal gasification, the researchers stumbled across a reaction which might prove to be ideal for coal distillation. The possibilities are all the greater because it can be applied to weakly caking coals and because, by providing an outlet for fines, it increases the tolerance of both pressure and cyclic processes towards coal supplies.

But in planning the research programme an important question arose. Were processes of the types mentioned likely to offer useful alternatives to carbonisation for some time to come? Should activities be limited to their development? What of the advances which are being made in the gasification techniques for powdered fuels? There is much discussion of the use of coal fines and of their probable increase with mechanised mining. There are possibilities, too, in the hydraulic transport of small coal. But with the Lurgi process taking coal down to one-eighth inch in the generator and needing an additional proportion of fines for steam-raising, this aspect does not appear too pressing at the moment.

A more compelling consideration was the belief that eventually powder techniques would give a better performance than is possible with a fixed fuel bed. Therefore those in charge of gas industry research concluded that gasification of powdered fuel cannot be neglected. Then another question arose: Which of the variety of powder techniques is most suitable for town gas manufacture? Having fixed-bed processes with considerable scope in front of them, there appeared to be no call for a powder process which could claim little more than that it was workable. It seemed that the main direction for powdered fuel research must be towards a process not far removed from an ultimate development as regards thermal efficiency, cost, and ability for widespread application——in brief, a thermal efficiency in excess of 80% and a cost per therm of gas not more than two-and-half times the cost per therm of coal.

But, even with that decision, several questions remained. With the erection of oil refineries, should there be persistence in earlier aims of being entirely dependent upon coal? Should regard be had to possible supplies of methane from mines or other sources? Should the process operate under pressure, should it use oxygen, and how much weight should be placed upon the present requirement for relatively small installations? Fortunately, these questions are to some extent inter-dependent, and much hinges on the size of installation.

Size of Unit

Regarding size, the view was taken that fixed-bed processes should be adequate and indeed preferable for small installations. The future of dust gasification seemed to be in large stations, and minimum sizes of 20-30 mill. cu.ft. per day should be no embarrassment. Given that, oil seems too dependent on technical developments in the oil industry, and other external enrichers are still the subject of investigation. It is realised that there will never be any technical difficulty about absorbing a methane supply, and that oil will have its place in the industry for as long as it is available. But it is still difficult to be convinced of the wisdom of allowing them to be essential to a basic process designed for some years ahead. Concerning oil, there is a growing demand for lighter fractions and there is an increasing availability of the heavier ones. These contain more carbon and, indeed, in an efficient process there would probably be sufficient carbon to produce the diluent for the yield of hydrocarbons. The raw materials for a coal-oil process would consist mainly of oil and there would be an insignificant contribution to the utilisation of low-grade coals—unless calorific values were reduced—and surely it is more desirable that they should rise. It may well be that in the future oil gasification will depend increasingly on separate oil-gas plants such as are being developed.

This has led to the belief that the gas industry's powdered fuel process should be able to use coal alone and therefore to be of a type which can provide its own enrichers. The use of pressure then has important advantages in promoting methane formation, and pressure will usually justify the use of oxygen. Experiments have shown that it will also facilitate the use of heavy oil, if need be. Within these boundaries, the experimental approach is characterised, as already mentioned, by the desire for the utmost performance.

Practice Abroad

It is interesting to compare these broad conclusions with those dictating the lines being followed in America and on the Continent. There are differences. In Germany more emphasis is laid, for example, on a desire to avoid oxygen. In America, on the other hand, they are prepared to use it almost prodigally. So far as America is concerned, this may be explained partly by the rapid rate at which plant is amortized, partly because of the high calorific value in which they are interested, and partly by the huge gas outputs being catered for. In search of output, a greater

sacrifice of overall efficiency is being contemplated than seems acceptable for this country. In Germany, the stress is more on the utilisation of low-priced fines for which there is a reluctance to incur the expense of an oxygen plant. In our own country, it seems unsafe to count on cheap coals of any sort—a B.Th.U. has a habit of remembering that it is a B.Th.U. Accept these explanations, commented Dr. Dent, and differences in the approaches to the problem appear reasonable.

The report records the stage which the experiments have reached. Broadly, the preparation period is nearing its end. Pilot plants for the gasification of sized coal and for the hydrogenation of powdered coal are now in operation, while results are being obtained in an experimental study of large-scale design of powdered fuel plants. Equipment to continue the work on the distillation of coal by hydrogenation is being assembled in Birmingham and should be complete early next year.

Output and Steam Decomposition

During the discussion Mr. J. H. Dyde pointed out that rising costs have forced Lurgi to increase outputs. In the post-war period output has been stepped-up to three times from a given grate area—not a bad performance. Advances have been made in this country, but can we claim any comparable development in any of our present carbonising or gasification processes? Then we have the question of steam supply, and here Mr. Dyde detects a weakness in the Lurgi process—and being a weakness it also presents a potential for improvement. Lurgi, in association with Ruhrgas, is tackling the problem of steam supplies reduced to the stage of slagging operation. The pressure gasifier at Nechells can allow similar study of the effect on British coals. In the present state of development 28% to 43% of the steam as recorded in the tests reported is undecomposed and gives rise to a large volume of liquor, some 400 gal. per ton. Disposal of such a large volume of effluent constitutes a problem in itself.

A further point brought out by Mr. Dyde was that, while the thermal efficiency represented by the ratio of the potential heat in gas, tar, and spirit to potential heat in coal supplied to the generator is high (85% to 90%), the overall thermal efficiency of the process, taking into account steam and power requirements and gas enrichment to 450 B.Th.U., is only 60%. This, in fact, represents no real advance on good carbonising plus the appropriate amount of seasonal and peak-load gas from orthodox water gas plants. It is only marginally better than low-pressure gasification of non-caking or weakly-caking coals now being carried out in France and elsewhere with such systems as Gaz Integrale; and these systems are known to be capable of further technical improvements to advance their overall efficiency. However, we must not lose sight of the fact that an extension in the range of coals for gas-making is one of our main objectives and is of supreme importance in the future development of the gas industry.

The fact that the Holten test has shown that the Lurgi process can deal with types of coal which represent about half the total mined in Great Britain was also emphasised by Mr. J. E. Davis. Technically, the pressure gasification of British coals is a process available to those who desire it, and the question Mr. Davies asked was: 'Does anyone desire it?' On this subject he expressed the opinion that many people are thinking in clichés, the two clichés in this instance being, 'Two-fuel industry' on the one hand, and 'All gas' on the other, as if there were no room for both or combinations of the two.

There was a time when coke ovens received coal for 8s. to 10s. a ton, and sold their coke for 18s. to 20s. a ton. The revenue from coke alone more than paid the coal bill and the wages bill, and interest and depreciation on the capital. Tar and benzole and ammonia were additional sources of income and gas was there for whoever wanted it. In these circumstances it would be difficult to find a cheaper method of gas manufacture. Locally, in the years since the war, there have been conditions, not quite as happy as these, but still very comfortable, from which coke could be sold to a fuel-starved Europe at twice the price per ton that was being paid for coal. In these circumstances, too, it would be inviting disappointment to seek a cheaper process of gas manufacture. But there have been times and places, and they have been long times and many places, where coke has been worth less than the coal from which it was produced.

Reactive Coke through Hydrogenation

Price is, intended to be, and roughly is, a measure of the customer's desire for what we have to sell, and if the customer expresses his lack of desire by offering only a low price, then why should we make the product? And the 'why' becomes underlined when we have to plead with and implore the supplier of our raw material to let us have enough of the coke-producing coals at a premium price in order to manufacture the unwanted product. The desire to find a satisfactory technical answer to this economic problem does not represent a school of thought opposed to the use of solid fuel. Coal is conveniently and efficiently carbonised by reaction with hydrogen under pressure to produce a highly reactive and largely desulphurised coke. This observation points to the paradox that the best way towards the ideal domestic solid smokeless fuel may be through the same technical approach as that to total gasification.

Gas Education

NEVER in its long history has the gas industry been more conscious of its need for the steady recruitment of young technologists and technicians to carry on its work and maintain its place in the economy of the nation. The best, and indeed the only, way to meet that need is to educate and train, and for that reason no apology is needed for saying that one of the most important sessions at the Autumn Research Meeting of the Institution of Gas Engineers was that devoted to the 30th report of the Gas Education Committee. Usually the report and the discussion deal only with the imparting of education; this year there was testimony from the 'receiving' end in the person of two members who had benefited from the residential course in management training at Brooklands College. There was emphasis, too, on the Christmas Juvenile Lectures as possible avenues for the introduction of young people to the adventurous careers offered by the industry.

That the year has marked a turning point was stressed by Mr. J. H. Dyde, who has so ably presided over the Gas Education Committee since Mr. John Terrace retired a few years ago, when he explained that the Higher Grade Examinations had given place to the new Associate Membership examination—'only because the Institution has grown in stature and importance.' Six years' notice of the change was given, affording students starting with no exempting qualification time to go right through the ordinary and higher examinations with a year's grace at any point in case of failure. There were criticisms—on one hand that the transition period was too long, and on the other that the Committee had been harsh on some students who had failed—but there is no going back on what was decided. The Committee will, however, do what it can to secure a measure of exemption on the basis

of results in individual subjects for the new Associate Membership examination.

Another change during 1953 has been the reconstitution of the District Gas Education Committees, bringing together at regional level area board representatives, technical personnel who are members of the Institution, and principals of technical colleges; and very useful work has already resulted from their activities.

Training for Management

The structure of the nationalised gas industry calls for more attention to the training of personnel in management and industrial administration, and one of the most interesting features of the report is the reference to the residential course at Brooklands County Technical College. Sir Harold Smith spoke to the Institution Council two years ago on the need for training for management, and the many Productivity Teams which have returned from the United States, the gas industry team included, all stressed the same need. Opportunity came this year—first the income for the first 18 months of a fund provided by the Woodall Duckham Construction Co., Ltd., for 10 years for the furtherance of education; secondly, the availability of residential facilities at Brooklands, combined with willingness on the part of the governors, principal, and staff of the college to meet the Committee in every way; and finally the ready and full support of the Gas Council and area boards. The printed report, with characteristic restraint, deals only with facts; Mr. Dyde, with more enthusiasm, said the course was 'an experiment well worth repeating;' but it was left to two of the students who were fortunate enough to be chosen for the course to tell in their own words of the very real help they had derived.

Due acknowledgment is made in the report of the facilities again offered by W. H. Allen, Sons, & Co., Ltd., of Bedford, for an eight-weeks' course of training in engineering, and of the organisation by the Ministry of Education of a course for teachers in gas subjects, held this year in Manchester. Sixty applicants were selected from a large number, and Mr. D. P. Welman, Chairman of the North Western Gas Board, took a personal interest in the course. One juvenile lecture was given in January, 1952, and one in January, 1953, but according to Dr. A. E. Haffner there will be several next month—one in London, one at Bournemouth, and three or more in Scotland.

More Students; Fewer Successes

Coming to the report of the Board of Examiners on the last examinations—a report which has already been summarised in the 'Journal'—Mr. Dyde had to confess that it was not pleasant in the facts it revealed. He had but one comment to make on certain statistics which he had before him. They revealed that the average number of students coming forward for the Higher Certificate Examination during the past three years was 70% in excess of the average of the three preceding years, and about 100% above the average of the three immediate pre-war years. There is little doubt that the very high proportion of failures during the past three years, reaching a maximum at this final stage, is in no small measure due to the build-up of students endeavouring, sometimes after two or three attempts, to secure passes at the somewhat lower qualifying standard of the old system.

The number of students coming forward to take the examination in Gas Salesmanship and Consumer Service continues to increase. In the last three years, for example, the numbers have advanced as follows: 40, 80, and 119; and considerably more are expected to sit for the examination next year. The results too are pleasing, and come at a time when the industry must look to its salesmen to secure its future in a competitive world. Tribute is due to the senior commercial officers of the boards who undertake the oral or practical demonstration in connection with this examination, for they are an integral and important part in the gaining of a certificate.

Education is never static. The work of the Gas Education Committee goes on continuously, and the industry must adapt its systems and methods to the changing conditions of our times and to the needs of the industry. It was noted with satisfaction that the Gas Council is about to publish two booklets giving information about the possibilities of making a career in the gas industry. The Institution is also about to publish its own booklet on the profession of the gas engineer.

There are some people in the industry who are a little concerned about the suitability of the linkage that the Institution has with the Institution of Civil Engineers; and some would like to see a closer connection with the Institution of Chemical Engineers, which, it must be admitted, has not yet moved far with its own National Certificate machinery. Already an approach has been made, and when the 'Chemicals' have completed the drafting of their educational regulations they will be ready to discuss with the Institution of Gas Engineers the possibility of a wider basis of exemption.

Too Few Centres

One of the principal concerns of the District Gas Education Committees will be to help the student to determine what path to pursue towards professional qualifications and to see that obstacles in that path are either removed or surmounted. As Mr. H. H. Brown, of Exeter, pointed out, the main difficulty is to ensure that suitable courses are available at a sufficient number of technical colleges to cover the ancillary subjects to a sufficient standard. That is a real problem in the less densely populated areas where, even in the larger centres, there is lack of facilities. Mr. Brown suggested that liaison should be promoted between similar district committees connected with civil, mechanical, electrical, and chemical engineering. The training has much in common. Gas salesmanship training, too, he suggested, could be much more closely in accord with entrance to the Incorporated Sales Managers' Association.

Mr. Brown offered a further suggestion concerning the Register of Teachers. That excellent development has much to commend it, and his plea was that District Gas Education Committees and the gas boards should ensure that all their teachers are on the Register, for they would then know that those teachers would receive most valuable advice and information.

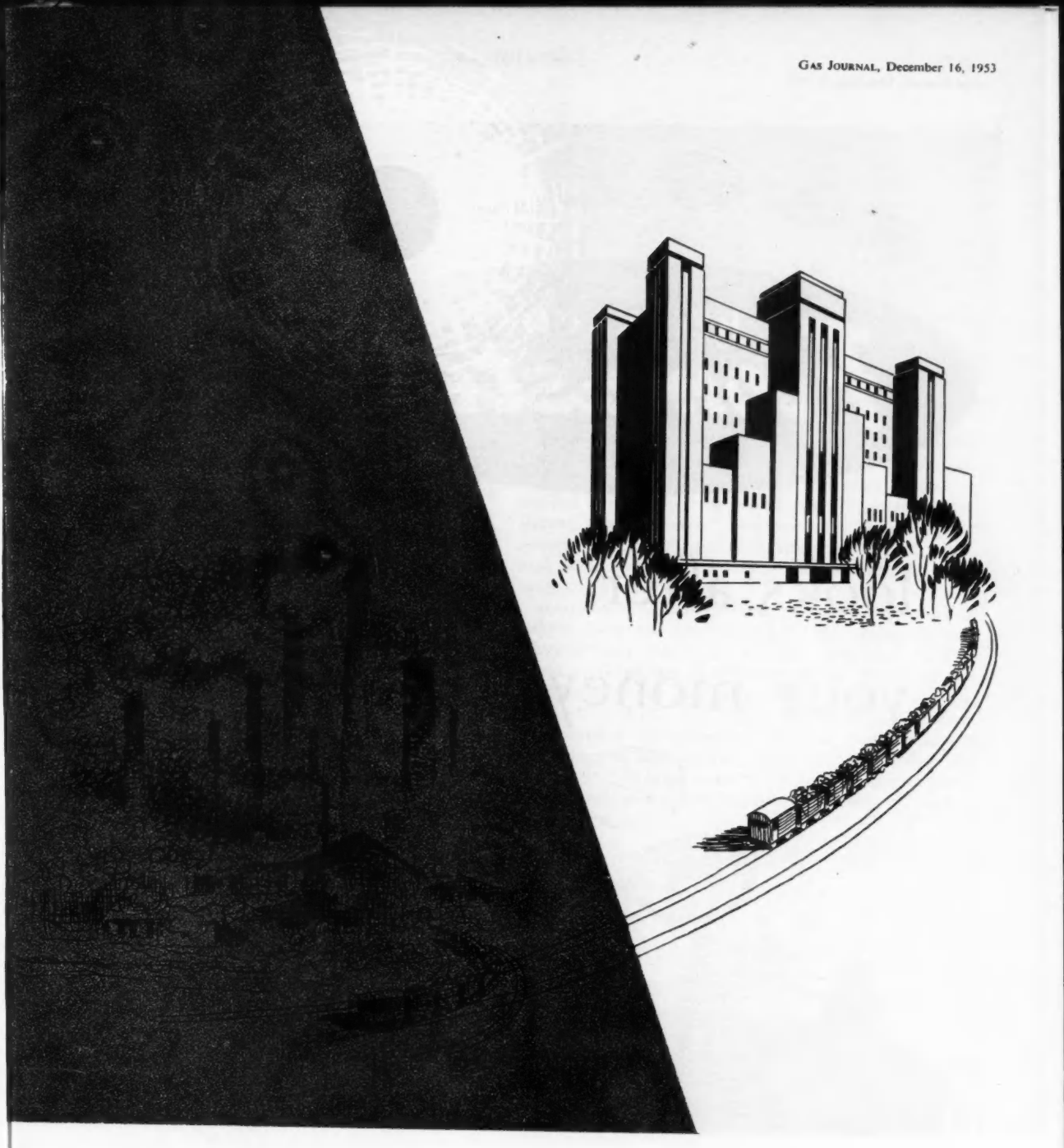
A questionnaire was circulated during the year to the teachers on the Register, to ascertain whether they had attended any of the short courses for teachers in gas subjects, which are arranged annually by the Ministry of Education. The replies indicated that there are still a number of teachers who have not yet attended one of these courses, and priority is being given to applications to attend from such teachers, although it is, of course, not possible to accept them all in the same year.

Another questionnaire was related to the equipment available for the use of visual aids, and also invited suggestions for subjects for film strips. It appears that most colleges and training centres are well equipped in this connection, particularly in regard to projectors.

The number of teachers on the Register at the present time is as follows: Gas Engineering (Manufacture) or the Technology of Gas Manufacture, 46; Gas Engineering (Supply) or the Technology of Gas Supply, 95; Gas Salesmanship, 32; Gas Fitting, 251.

Among matters discussed at the Eighth Gas Education Conference, which was private and was not reported in

(*Continued on p. 729*)



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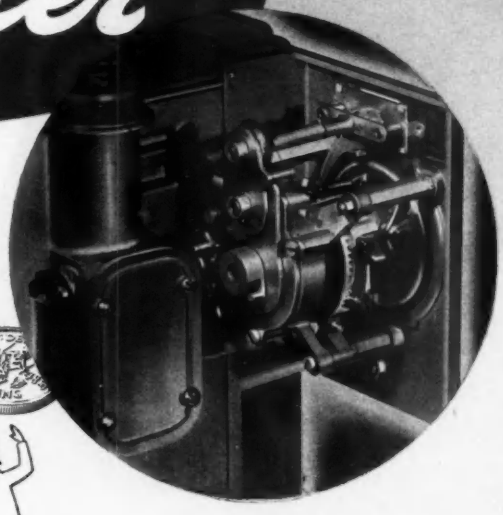

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W-D/I.F.E.

COMPLETE GASIFICATION PLANT

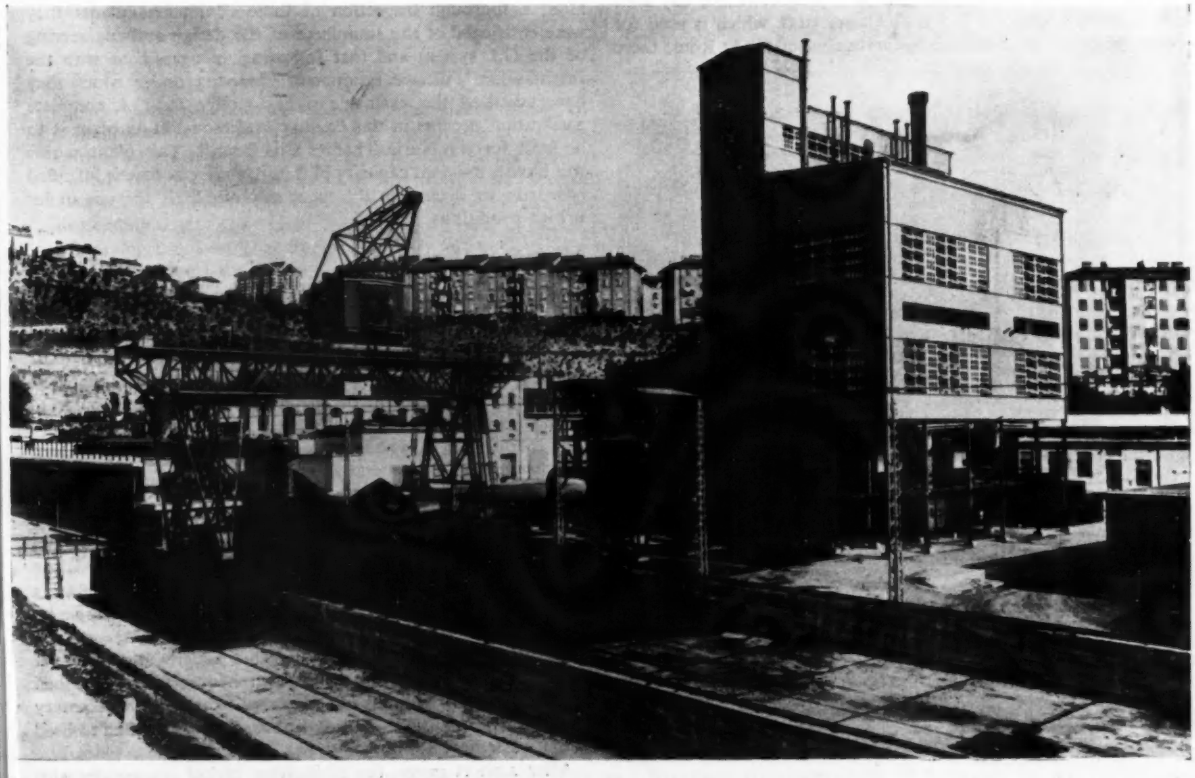
(G.I. SYSTEM)

In the 'Journal' for July 8 we announced that the Woodall Duckham Company had acquired from the G.I. Group the exclusive rights in Great Britain for their system of complete gasification. By courtesy of 'W.D.' and the North Thames Gas Board we are now able to publish a description of the process and data relating to the pilot plant now under construction.

The gas industry has been constantly warned during the last few years that the supplies of coal in this country which can be used in conventional gasmaking plants are dwindling and that the accepted pattern of carbonisation allied with water gas production which has served the industry so long and so well will be subjected to an increasing strain in the future. On the one hand the continued expansion of the hard coke industry will absorb an ever greater proportion of the better coking coals, while on the other hand the Coal Board's plans for major expansion of production lie mainly in just those weakly swelling coals which have hitherto been least used for gasmaking.

These trends combine with a fear that the demand for coke will not keep pace with the gas load to stimulate interest in complete gasification processes capable of making town gas from weakly caking coals without leaving a coke residue. The demand is naturally for a proven process having a reasonable capital cost, with a high enough efficiency and large enough unit capacity to keep down running costs.

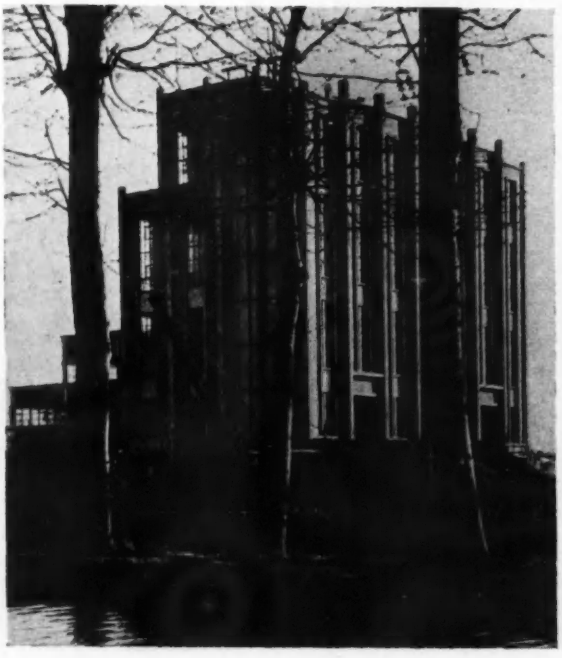
In continental countries this comparative shortage of coking coals has long been felt, and during the last thirty or forty years many attempts have been made to develop a complete gasification process based on pre-distillation of the coal in a retort followed by cyclic gasification of the coke residue in a generator beneath. This method has advantages over the combination of carbonisation and separate water gas production; the capital cost is lower and there are also the technical considerations that the external quenching of coke is



GENERAL VIEW OF TRIESTE GASWORKS, SHOWING G.I. COMPLETE GASIFICATION PLANT

avoided and that there is no loss due to the production of breeze, as in the conventional dual system. It has long been recognised, however, that the successful complete gasification of coal in a cyclic generator in this manner is dependent on efficient pre-distillation to free the fuel from most of its volatile matter before reaching the gasification zone, so that volatiles are not lost during the blow period. The direct use of coal in a water gas generator designed for coke leads also to other serious disadvantages owing to the very rapid heating of the incoming fresh fuel, with consequent heavy cracking of the hydrocarbons evolved and the production of an emulsified tar containing a high proportion of water which is very troublesome to separate, whereas in a properly designed pre-distillation retort the coal undergoes a low temperature carbonisation which ensures a minimum degradation of the released volatile matter and enables substantially water-free tar to be recovered.

The principal difficulty encountered in the early 'double gas' plants, as they were called, was to develop gasmaking units of high enough efficiency and large enough unit capacity to make them economic for use on large works. Much of the pioneer work in improving the size and efficiency of this type of plant was done by Professor Strache of Vienna at the beginning of the century, and it is from his early investigations, backed by the experience gained in building many installations, that the modern G.I. process has been evolved. This system of complete gasification has now been developed to the stage where units of 2 mill. cu.ft. per day capacity are in regular use at several continental works, giving yields of over 190 therms per ton on the dry ash-free basis from weakly- and non-swelling coals, and generators with an even larger capacity are being projected. Of modern G.I. plants built since the war, there is one at Naples comprising two generators of 3 m. (9 ft. 10 in.) diameter, having a rated capacity of 2 mill. cu.ft. per day each at a calorific value of 335 B.Th.U. per cu.ft. which is used for diluting gas made in continuous vertical retorts. At Rome there are three generators of this size, also diluting continuous vertical gas to give a final calorific value of 430 B.Th.U.



EXTERNAL VIEW OF VIERZON G.I. PLANT

TRIESTE—SHOWING BASES OF TWO 2-MILLION CU.FT. PER DAY GENERATORS AND WASTE HEAT BOILER

G.I. plants can also be operated with oil carburetting, and since the calorific value without enrichment is about 330-335 B.Th.U. per cu.ft., the amount of oil required to bring the gas up to town gas standard of 450-500 B.Th.U. is substantially less than in the case of a carburetted water gas plant. At Trieste, where the undertaking purchases a large proportion of its gas from nearby coke ovens, two 2-mill. cu.ft. G.I. units equipped for carburetting were installed in 1951 to dilute the bought gas and give added flexibility, although the carburetting equipment is only used during peak load periods. At Vierzon, in central France, however, there is a carburetted G.I. plant which is the only source of gas for a considerable network including the large town of Bourges, and the two 1-mill. cu.ft. generators which were installed in 1951 make a gas of 440 B.Th.U. per cu.ft. continuously.

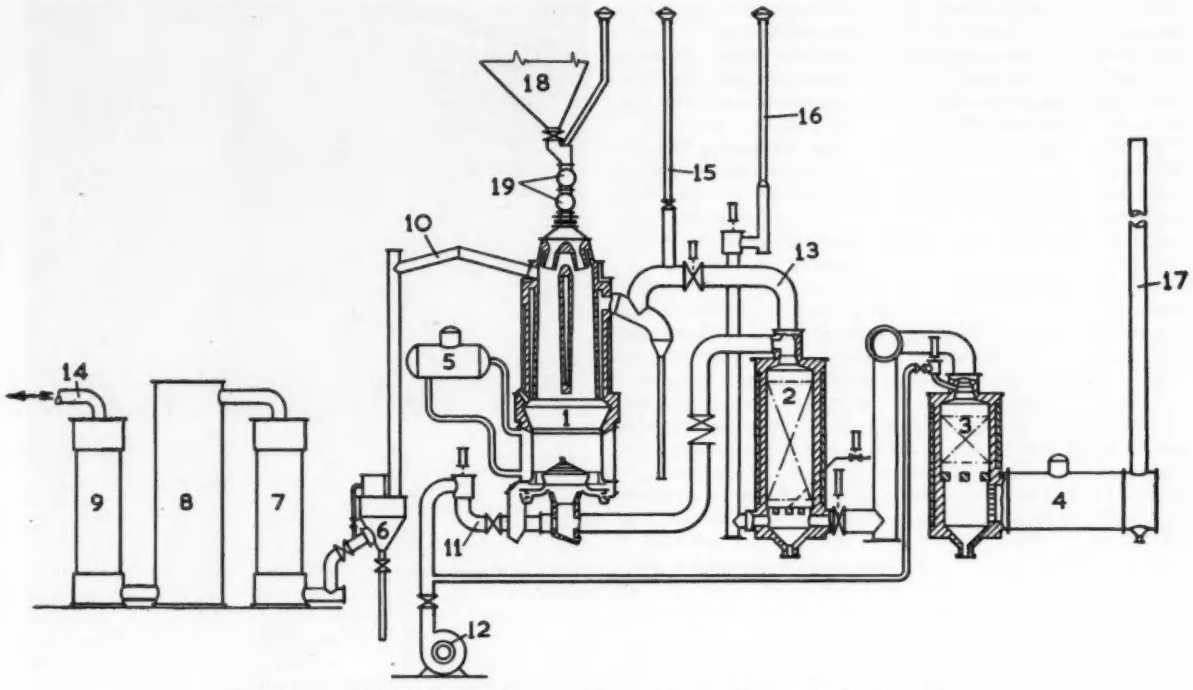
A Demonstration Plant

The Woodall-Duckham Company recently announced that after a thorough inspection of these continental plants they were convinced of the soundness of the design and engineering of the G.I. system and that following an agreement with the International Furnace Equipment Company under which they have acquired the exclusive right to offer the G.I. complete gasification process in this country, a demonstration plant is to be built for the North Thames Gas Board. This plant, which will have a nominal capacity of 2 mill. cu.ft. per day, is intended primarily to determine the most suitable coals for use under British conditions.

Method of Operation

This demonstration installation will be designed for carburetting, and in this respect will follow the plant at Vierzon which has given two years of satisfactory and reliable operation. The working of the G.I. system of complete gasification can most easily be followed, however, by reference to Figure 1 which is a schematic arrangement of an uncarburetted plant similar to those working at Naples and Rome. The principal vessels are the generator (1) in which is included the pre-distillation retort, the chequer-filled regenerative steam superheater (2), the combustion chamber (3) and the waste heat boiler (4). During the blow period, which lasts about 1 minute, air is blown by the fan (12) beneath the grate of the water-jacketed generator and the blow gases are led away from the top of the gasification zone through cavities in the distillation retort walls, imparting some of their sensible heat to the descending coal charge by conduction through the brickwork. The blow gas passes via the main (13) to the regenerative steam superheater, where it is burnt with secondary air to heat the chequer filling, and then goes on to the combustion chamber where any necessary tertiary air is admitted. The fully burnt gases are then utilised in the waste heat boiler.

After a short purge, the gasification period commences with the admission of steam to the base of the regenerative steam



SCHEME OF W-D/I.F.E. COMPLETE GASIFICATION PLANT (G.I. SYSTEM).

1 Generator.
2 Regenerative steam superheater.
3 Combustion chamber.
4 Waste heat boiler.
5 Steam drum.
6 Hydraulic seal.
7 Hot gas detarrer.
8 Condenser.
9 Cold gas detarrer.
10 'Integralgas' main.
11 Air blast main.
12 Air blower.
13 Blow gas main.
14 'Integralgas' main.
15 Generator vent.
16 Regenerative steam superheater vent.
17 Boiler stack.
18 Coal bunker.
19 Automatic coal feed.

superheater, from the top of which the steam passes by a brick-lined main to the bottom of the generator at a temperature of about 800°C. The water gas made in the generator ascends the pre-distillation retort and by transfer of its sensible heat effects complete distillation of the volatile matter in the descending coal. The 'integralgas' (a term used for water gas containing the volatile matter of the coal) at 200°C. passes by way of the main (10), where it is spray-cooled, to the hydraulic seal (6) which contains a mechanically operated bell. This is followed by a hot electro-detarrer (7) which works at about the dewpoint of the gas (70°C.) and removes the bulk of the tar. The gas is finally cooled in the tubular cooler (8), any entrained oil being removed in the cold electro-detarrer (9). On the continental installations the cooled gas passes to the relief holder without further treatment, and thence to the purifiers.

After the gasification period, which lasts from 3 to 4 minutes, a short purge completes the cycle and the blow commences again.

Carburetted 'Integralgas'

The carburetting of 'integralgas' has been developed on lines parallel to that of water gas from coke, as exemplified by the Vierzon plant mentioned earlier. 'Integralgas' possesses the advantage over water gas that it is initially higher in calorific value by some 40 B.Th.U. per cu.ft., and the full advantage of coal gasification in this respect is realised if the tar vapours are fixed on leaving the retort, when the calorific value can be further raised to about 350 B.Th.U./cu.ft. Thus to obtain a final gas of 500 B.Th.U./cu.ft. only about three-quarters as much oil is needed as for water gas.

In a G.I. plant, therefore, the carburetting equipment performs three functions:—

(i) Fixing the tar in the raw gas,
(ii) Carburetting the gas with added oil, and
(iii) Fixing the vapours from the added oil.

This is accomplished in two vessels in series; in the first, the gas flows downwards through heated chequer-work to fix its own tar, whilst the second vessel, in which the gas flow is upward, contains the carburetter and the chamber for fixing the oil vapour. These vessels are heated by blow gas from the generator during the blow period.

This short description outlines the method of operation of recent G.I. plants which are giving service as reliable and proven gasmaking units. For the future, various developments are being pursued in connection with projects now in hand as a result of which further simplification as well as improvement in output and efficiency are anticipated.

Features of the Plant

One of the chief problems associated with the development of complete gasification systems of this type has been the design of the pre-distillation retort. When a plain circular retort is used, there is a tendency for the descending column of coal to be carbonised more quickly on the outside, so leaving an undistilled core when the gasification zone is reached and giving rise to such troubles as smoke emission from the stack and loss of volatile therms. This difficulty has been overcome in the G.I. process by the use of radial division walls splitting the retort up into segments and so

ensuring even carbonisation of the whole charge. The adoption of the correct taper on the retort walls is also a matter of great importance, and the present G.I. design has been evolved after much experiment to secure regular travel of the charge combined with optimum contact between the ascending gases and the coal.

Great attention has been paid to the engineering features of the plant, with a view to ensuring the utmost mechanical reliability and reducing operating labour to a minimum. For example the coal feeding device, which is entirely automatic in operation, consists of a pair of motor-driven drums which form a gas lock and admit a small quantity of fuel on every revolution; its working is controlled by a feeler arm which senses the level of the coal in the distributing chamber above the retort. Owing to the comparatively low gas offtake temperature, the mechanism is not subject to heat as the charging gear of a water gas machine is, and consequently it requires very little maintenance. For ash removal, a mechanical grate of the dry sealed type is provided; this is of solid design and is supported on automatically lubricated skid rings. On the larger units this grate is driven by a pair of diametrically-opposed hydraulic rams which are actuated by the attendant at regular intervals, a system which has been found very satisfactory, whilst on the 1 mill. cu.ft. per day generator a worm drive has been adopted. All the valve changes necessitated by the cyclic operation are effected hydraulically by an automatic operator, in which the main power control valves are actuated by pilot valves working from a cam shaft. Safety interlocks are provided to prevent any dangerous sequence of operation.

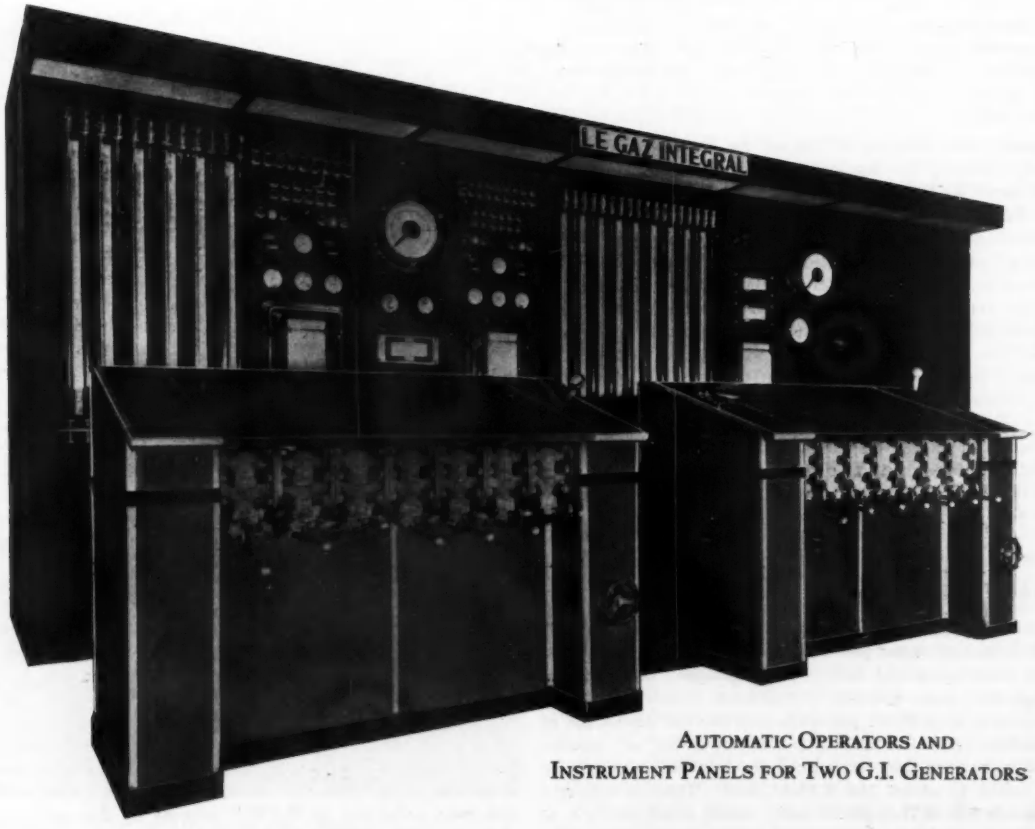
Coals Used

The continental G.I. installations are normally operated on high volatile, weakly swelling coals sized within the range ¼ in. to 3 in. and having B.S. Swelling Numbers of 3½ or below from the Lorraine, Upper Silesian and East Midlands coalfields. It will be one of the objects of the demonstration plant to be erected for the North Thames Gas Board to explore the type of British coal best suited to the plant and the extent to which small coal can be gasified economically, but in this connection it is interesting to note that the production of coals with Swelling Numbers of 3 or below and which should be suitable for this type of plant is already estimated to be over 100,000,000 tons per annum.

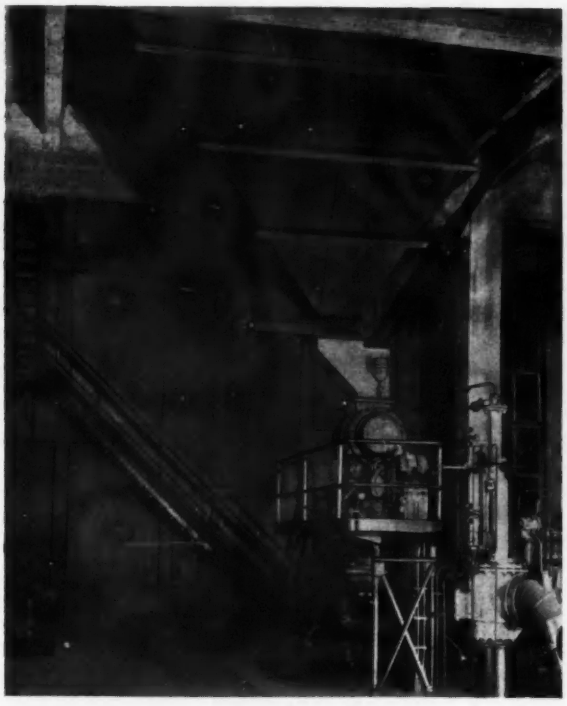
BASES OF TWO 1-MILL. G.I. GENERATORS AT VIERZON WITH DRY-SEALED GRATES, SHOWING ASH HOPPERS

Other Applications of Pre-Distillation

Although the G.I. plants so far described all make gas for town's purposes, the principle of pre-distillation applies



AUTOMATIC OPERATORS AND INSTRUMENT PANELS FOR TWO G.I. GENERATORS



TOP OF ONE OF THE VIERZON G.I. GENERATORS, SHOWING AUTOMATIC COAL FEED AND 'INTEGRALGAS' MAIN

equally to other types of gasification and enables coal to be used to advantage instead of coke. There are on the continent many G.I. pre-distillation synthesis gas generators and producers similar in construction to G.I. complete gasification units, the former being cyclic in operation and the latter worked with a continuous air-steam blast.

In the case of the G.I. coal-fired producer, only a part of the lean gas made in the gasification zone has to be passed up the retort to distill the incoming coal charge, the remainder being withdrawn by an offtake at the top of this lower zone as a 'bottom gas' free of volatiles. This has the advantage that the 'bottom gas' can be dedusted before being mixed with the 'top gas' without any difficulties due to tar, and since the volatiles are not over-cracked as in a normal coal-fired producer, a dry dust-free tar can readily be recovered. The gas can, of course, be used hot, but if cooled and cleaned it is suitable for firing coke ovens, an application for which G.I. producers are already in service at Strasbourg. Two G.I. pre-distillation producer plants are at present under construction in this country.

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3. Giordano — *"Complete gasification in the chemical industry and particularly in the gas industry."* (*5th International Gas Conference, 1952.*)

(*Research Meeting Review, continued from p. 724*)

the Press, were the disappointing results obtained in the examinations in Gas Engineering (Manufacture) and (Supply). These results were again attributed, in part, to the fact that many candidates were entering for the examinations before they were fully prepared, and, as it was thought unlikely that the results of the final examinations in 1953 would show much improvement over those of 1952, consideration was given to the advice that should be offered to unsuccessful candidates in regard to their future studies.

Other matters discussed at the conference were the approved courses for Higher National Certificates in Civil and Gas Engineering, the revised syllabus in Gas Technology (Supply) on which candidates for the Certificate in Gas Salesmanship and Consumer Service would be examined, the results obtained in the 1952 examinations in Gas Technology (Manufacture) and (Supply) of the City and Guilds of London Institute, and the very successful teachers' course at Norwich, organised by the Ministry of Education.

Tributes to Mr. Fulton and Dr. Thorne

Through the resignation of Mr. David Fulton and the retirement of Dr. P. C. L. Thorne, the committee has lost the services of two of its long-standing members whose enthusiasm and considerable experience in the educational field have been of great value to the Institution. Mr. Fulton was one of the original members of the Gas Education Committee when it was formed over 25 years ago, and, together with Mr. James Hall (Glasgow), has been responsible for most of the arrangements for the education and training of gas engineers and technologists in Scotland. It was through their efforts that negotiations were satisfactorily concluded with the central institutions and other technical colleges in Scotland for the provision of courses in gas engineering and allied subjects. Mr. Hall has accepted the invitation of the Council to act as one of its nominees on the committee and to fill the vacancy created by Mr. Fulton's resignation.

Dr. Thorne has been an inspector of technical education with the Ministry of Education for over 20 years, during which time, in succession to the late Mr. C. H. Creasey, H.M.I., he has taken a special interest in the education schemes of the gas industry. He served on all of the Institution's Education Committees, as well as on some of the District Gas Education Committees, the Advisory Committee on Education and Training to the Gas Council, and the Advisory Committee on Gas Subjects to the City and Guilds of London Institute. The gratitude of the gas industry is due to Dr. Thorne, not only for his helpful service on these committees, but also for the liaison work with the Ministry of Education and the technical colleges, which he maintained on behalf of the Institution, and particularly for the short courses for teachers in gas subjects, which he organised annually.

THE Coke Oven Managers' Association has published its 34th successive Year Book, which maintains its position as the foremost publication in matters relating to the coke oven industry. The editorial committee is meeting an ever increasing demand, year by year, from technological institutions, libraries and those employed in the industry both at home and abroad. The report of the Council states that after a satisfactory year's work the financial position of the Association has been maintained and the register remains steady.

The list of foreign plants has been extended considerably this year and in a preface the editorial committee expresses thanks to the construction companies, overseas members and their friends who provided much of the additional information.

THE discussion is now published of the paper by G. E. Hall and G. W. Lee, 'Blending of Coal for Carbonisation,' presented at the May, 1953, meeting of the Institution of Gas Engineers. Copies are available from the Secretary; price per copy, 1s. 6d., post free.

NON-SPARKING TOOLS

By C. H. MEIGH,

M.Inst.Met., Managing Director, Meigh Castings Ltd.

The present article describes the latest methods by which steel is being used in the manufacture of heavy-duty non-sparking tools, and refers particularly to the use of 'Composite' castings (Prov. Pat. No. 31134, September 12, 1952).

High grade steel forgings are now being used as a reinforcing component of castings made in non-sparking material or, inversely, non-sparking material is being used as a protective component of a steel tool. The production method was originally devised to provide pneumatic digging tools with shafts of sufficient strength to withstand heavy duty when used in existing tool holders, and the following notes deal, principally, with the various aspects of this application.

The non-sparking alloy used has a copper-aluminium basis with additions of nickel, iron, and manganese, sold under the name of 'Meigh Metal.'

Bonding

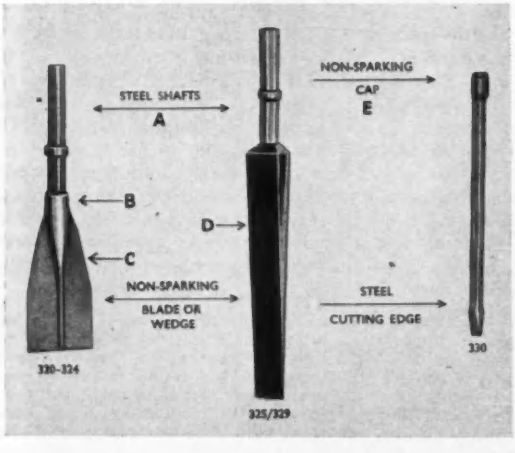
There is nothing new in the idea of building-up tools or other objects of ferrous and non-ferrous metals, but experience has shown that, ultimately, all bonding methods rely on the strength of the bonding material itself and on its power of adhesion to the assembled metals. When brazing or soldering is used, a certain amount of inter-crystaline penetration improves adhesion but, whereas bonding is satisfactory for soft anti-friction metals, no bonding has yet been invented that will satisfactorily unite metals of over 40 tons per sq. in. tensile strength which are subjected to repeated shock, strain, and temperature variations necessary for annealing.

In the 'Composite' casting process under review, no bonding is used and the component metals are united so that they are not loosened by the heaviest working conditions which may embody repeated shock and annealing operations.

Design

If a pneumatic digging tool is taken as an example the principal features of design are:—

A forged steel shaft 'A,' of suitable characteristics and dimensions to fit a standard tool holder, on which is cast a sleeve or boss 'B' in non-sparking material (see accompanying



Patent composite tools in Meigh non-sparking metal and steel.

diagram). The sleeve and shaft reinforce one another mutually and are completely rigid. The sleeve can then be extended to any desired form such as a spade 'C' or wedge 'D,' and stress distribution can be ensured by the use of appropriate profiles, webs, etc.

Stress concentrations which might otherwise cause ultimate failure are avoided by the suitable adjustment of sections, so that the complete rigidity of the shaft and sleeve gradually gives place to a degree of flexibility in the steel shaft at one end and the spade or wedge at the other. Limited flexibility and consequent vibration have been found, in certain cases, to increase the work output of the tool.

Blade Area and Works Output

The influence of blade area on the work output and the life of a digging tool is frequently overlooked by the user, although it is, in fact, a vital factor in determining the bending load to which the shaft of the tool can be subjected when leverage is employed. Generally speaking, the life of a tool depends on the repeated bending loads to which the shaft is subjected.

Experience shows that, when hard oxide is being worked, the blade area of 40 sq. in., width 5 in., will produce the maximum bending load that a steel shaft of 1¼ in. hexagonal section will take for any length of time without breaking.

If a blade of say 27 sq. in., width 3 in., is used on the same oxide, the bending stress on the shaft is reduced to a negligible quantity, but the work output of the smaller blade is less than that of the bigger, and between these two extremes there are a number of blade sizes the choice of which depends entirely on working conditions.

Another important factor in the work output and life of a digging tool is the 'set' or 'curvature' of the blade, particularly when the oxide or other material to be worked has a tendency to be 'brittle' as opposed to 'dead' like clay.

The 'set' which causes the blade to run off the straight during penetration also develops a certain amount of vibration in the tool, and this helps to split-up or disintegrate a brittle substance. Vibration also tends to accelerate work-hardening and the extent of this should be curbed by periodical, low temperature annealing of the non-sparking metal.

Wedge-Shaped Pneumatic Tools

The sleeve 'B' of the composite digger forms a wedge of restricted area which comes into action at the end of penetration, and in certain cases this assists the splitting of the oxide. In cases where the full wedge-shaped tool is found to be more effective than other types, the following considerations are worthy of note.

The object of using a wedge-shaped tool on an oxide bed is to set-up two forces in the bed—a compressive force in front of each face of the wedge and, at each side of the wedge, a splitting force—without subjecting the shaft of the tool to bending stresses. If these forces are exerted at a relatively short distance from the border of the oxide mass, splitting occurs before the balance of the available force is absorbed by the compression of the mass.

Inversely, if the distance from the border of the mass is increased, a point is reached at which the resistance of the mass to splitting is greater than the resistance to compression, and no splitting occurs unless the object of the wedge is defeated by using the tool as a lever, in which case the supplementary force splits the oxide mass and sooner or later breaks the tool by subjecting the shaft to overstrain.

The distance from the border of the oxide bed at which the wedge can be safely used varies with the hardness and texture of the oxide, but it can be determined by trial, starting with a minimum distance and increasing to a point at which reasonable work output is obtained without excessive fatigue to the tool.

If the tool breaks at a defect, it is the fault of the tool; otherwise it is the fault of the operator or due to lack of proper maintenance.

It should be understood that the lighter the wedge the greater the work output per unit of energy employed. First because dead weight absorbs power, and secondly because a limited amount of vibration which is set up in a slightly flexible section tends to disintegrate the oxide. Finally, whereas the digger blade can be varied to a considerable extent in area and shape as mentioned above, to suit different types of work, experience points to more restricted limits in wedges. For example, if a face width of 2½ in. is taken as a standard dimension, a taper per foot of 1¼ in. for hard oxide and 1½ in. for soft or medium, and a length to suit the depth.

Annealing

The effect of work-hardening can be cancelled by low temperature annealing or normalising at 600°C. (1,112°F.)—*i.e.*, a dark red colour in daylight or cherry red in a

(*Continued on p. 735*)

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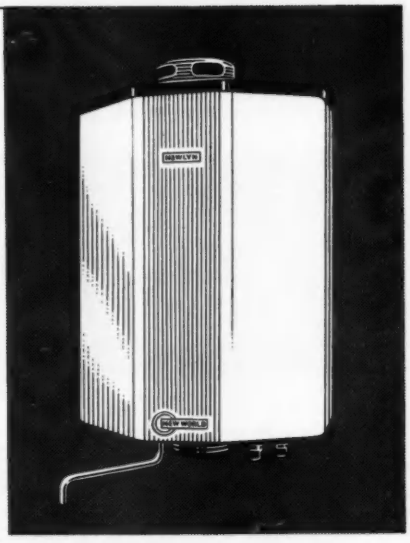

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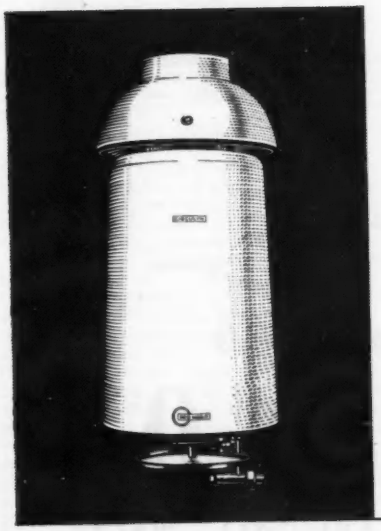

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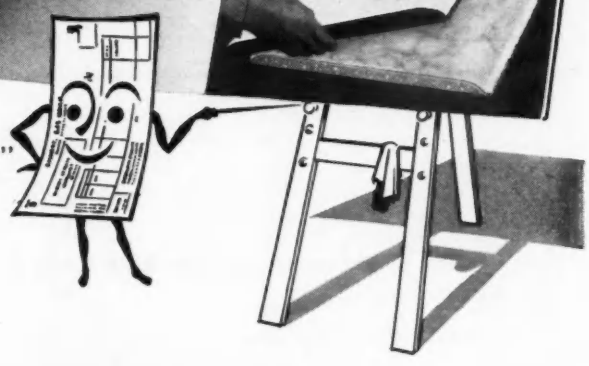

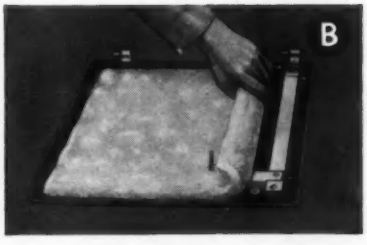

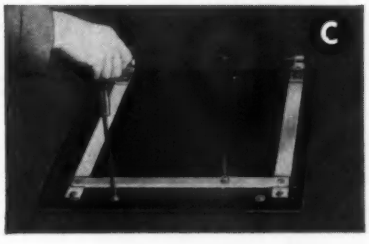

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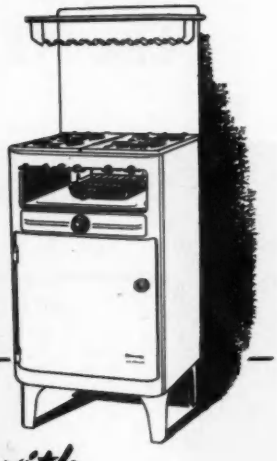

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darkened shop. The metal is completely annealed at 850°C. (1,560°F.), but, as the melting point of the metal is 1,080°C., it is unwise to use temperatures higher than 750°C. unless a muffle is available for heating and the temperature is controlled by a pyrometer. The normal practice is to heat tools on an open hearth to about 700°C., draw out the point or cutting edge on the anvil, hammer-harden the point, and allow to cool in the air.

If the shaft of a pneumatic tool is in 'Meigh Metal,' it should be annealed to within a short distance of the collar. The shank fitting above the collar should be kept cool. When annealing the safety blade or wedge of a composite tool, it should not be found necessary to heat the steel shaft, but, even though the shaft were heated, the cast-on 'Meigh Metal' would not work loose.

It is considered sound practice in the case of purifier tools to rectify the points, and at the same time normalise the body of the tool, after each box. If less frequent intervals are used the operation is apt to be overlooked.

Shaft Protection

It may be argued that non-sparking tools which have exposed steel surfaces are not entirely safe, and the extent of risk is worth considering. In pneumatic tools, the tool holder is in steel and the shaft immediately below the holder presents no more danger than the holder itself. The spade or digging end of the tool is in non-sparking material, and between the spade and the shank holder the shaft may be considered as presenting different degrees of danger which decrease towards the holder.

The danger might come from an accidental impact but, as there is little or no wear by friction, effective protection can be procured by spraying the exposed steel surface with some of the 'rubberised' or other protective coatings that are in use, for example, in the motor car industry.

Tools such as cold chisels present a somewhat different problem inasmuch as the cutting end must be steel if heavy duty is required. Appropriate methods of protection must be used to prevent sparks—*i.e.*, white hot or incandescent particles—being formed and projected from any part of the tool. As the danger area, at the cutting end of the chisel, is very small, sparks can be prevented by applying grease or water to the surface of the object to be cut, the effect being to lower the temperature of detached particles and, to some extent, impede their projection.

The head of the chisel, which is liable to receive glancing blows from a hammer, can be protected by casting on an impact cap or pad 'E' in non-sparking metal, and the body of the tool between the point and the cap can be protected by an expanded tube in indiarubber or plastic material.

In the event of the tool being drawn out' on the anvil the tube is temporarily removed but, for ordinary sharpening by grinding, it can remain in place.

Conclusion

In certain cases, where non-sparking metals are not sufficiently strong or hard to be successfully used for heavy duty tools, it is impossible to use a combination of steel and non-sparking material which affords adequate protection against sparks. The so-called sparks against which protection is sought are, in fact, particles of steel or minerals detached by impact or friction and heated by oxidation or otherwise to a temperature approaching that of incandescence. Detached particles, although visibly hot, are not necessarily hot enough to ignite gas or explosives.

Applications of the principle of composite castings, in which bonding is not employed, are by no means limited to the few examples given in these notes. The principle, as such, is subject to development in the light of experience gained, and can be used in conjunction with other means of protection, such as various kinds of non-metallic coating.

Finally, it should be understood that conditions can be made more or less favourable for the creation of sparks or the heating of detached particles. Dryness, generally speaking, is favourable to the creation of the necessary heat, while moisture and grease coverings are unfavourable.

It is obvious that certain operations such as clearing an oxide purifier must be carried out without moisture, but grease can be used on all but the part of the tool which penetrates the oxide, and there are a number of 'outside operations' in which limited moisture or even a water covering can be used without inconvenience.

ELECTRONICS IN THE INDUSTRY

THE following is our report of the discussion of the paper given by Mr. G. M. Rimmer, M.I.E.E., M.A.I.E.E., Electrical and Mechanical Engineer to the West Midlands Gas Board, on 'The Introduction of Electronics to the Gas Industry,' given at the autumn meeting of the Midland Section of the Institution of Gas Engineers on October 30. An abstract of the paper was published in the 'GAS JOURNAL' of November 18, p. 463.

Mr. W. Macnaughton (Chairman of the Section) said how grateful they were to Mr. Rimmer for dealing so attractively with a subject the importance of which would undoubtedly grow in the future.

Mr. John Milne (Assistant General Manager, Electric Construction Co., Ltd.) said that few could appreciate fully how much thought and work was required to deal in an orderly way with a subject of the type. In the time at his disposal, Mr. Rimmer had indicated succinctly how electronics could be applied to the gas industry. This application embraced so large a field that sometimes they were inclined to become confused as to where it started and led to. One of the points in its application to the gas industry was that manufacturers must treat it by building equipment with the utmost reliability which could be readily put into service. He did not think the average practical gas engineer really wanted to service these electronic units. The equipment was therefore built in the form of units which could be interchanged, so that in case of trouble arising with one they could plug in with another unit, and report to the manufacturers for service purposes.

None of them, however, needed to be frightened of electronic gear and equipment, which was a valuable tool provided it was the right tool for the purpose in view. Electronics was a relatively complex and specialised business, and its reliability in wireless and television technique did not make it necessarily suitable for gasworks operation. But all applications for industrial purposes did not necessarily involve complexity. Rectifiers were fundamentally electronic devices which had been in operation for 20 to 40 years, and had given reliable results. Here Mr. Milne referred to spare plugging units for rectifiers, and said rectifier drives for compressors had become fairly general, and were pioneered at the Longbridge Works (the Austin Motor Co.) by the author of the paper and himself nearly 10 years ago. They built a small unit to see how reliable it was, and he considered that it had proved to be a most efficient type of drive for compressors. Today there were very much larger sets operating at Coventry (515 H.P.), Bristol (400 H.P.), and at Stourbridge and other places. They were fundamentally simple, but to associate them with radio and television would be wrong; and he had no hesitation in saying that the author had proved these drives to be most efficient and reliable in connection with gas boosters. Alluding to the work done in the West Midlands, Mr. Milne mentioned grid control for small drives to provide air for producers, which was also pioneered in Birmingham, and pointed out that grid control was suitable for the small, not large, type of drive. He stated that a lot of this development work had been done in that quarter, and variable speed sets were being supplied to Canada, the U.S.A., and Australia, where the problem of servicing was much greater than here. Therefore the factor of reliability must be high. The speaker also commented that development work for special control was being undertaken by the author.

In Actual Gas Making?

Mr. D. A. Green (Coventry) remarked that the gas engineer had his own particular problems to consider, and no doubt the choice of these problems would help each of them to get his own grasp of this difficult subject. At any rate, there were plenty of operations for which they would like to see some practical automatic control. There was the instance of gas-making itself. Attempts had been made, with little success, to control the throughput of the continuous vertical retort by relay from the calorimeter recorder. These attempts seemed to break down because the force which could be exerted by the recording lever of the calorimeter was too small to actuate accurately any sort of relay of a mechanical kind. But here they seemed to have in electronics such aids as the 'capacity-sensing device' which required no mechanical power at all to operate them. The point in the operation of the continuous vertical retort was that there were three factors to be adjusted to the one uncontrollable variable, the quality and properties of coal. The skilled operator adjusted his retort bench to the best rate of coke extraction, the correct amount of steam injection, and the necessary temperature range in the setting to give the best result in output per retort and make per ton at the standard calorific value. The problem was to vary these

factors when a change in the coal supply caused a deviation from the standard calorific value of the gas made.

Mr. Green said it would be a great advance if only the coke extraction speed could be automatically controlled from the calorimeter, and it would occur to them all that the 'capacity-sensing device' might prove at least the starting point for the solution of the problem. Would it be possible to combine this control in a corresponding control of the steam supply, either in pressure or volume? If so, a considerable increase in average efficiency of gas-making would be realised. There would be similar problems in the control of water gas generation and in the operation of producers. One also had in mind automatic control of temperature and moisture content in oxide purifiers; and no doubt many other desirable objects could be suggested to the technologist of electronics. He felt sure that if Mr. Rimmer—perhaps on some future occasion—would explain just how electronics could be applied to two or three of these definite problems, the gas engineer would be better able to understand what was going on. Finally, he asked the author what he thought the effect would be on the cost of works maintenance if electronic control was adopted to any considerable extent.

Counsel of Caution

Mr. B. Lawrence (Walsall) said that having been privileged to see some of the research work which Mr. Rimmer had done, he appreciated the complexity of the problem and the way he had tackled it, but he himself would urge that they should be very careful about the introduction of electronics to the gas industry. No doubt the problems which could be tackled in the gas industry by electronics were many and varied. The author had indicated a number of relatively simple jobs which could be tackled. He felt that they should tackle these first, rather than go on to complicated problems and a number of variables further complicated by the human element. Mr. Lawrence pointed out that they had all used electronics in some form or another for a number of years in their internal communication system, radio-speaking units, and mercury-arc rectifiers, and he suggested that means might be found for them to get together to ensure that Mr. Rimmer's enthusiasm and knowledge regarding electronics were directed to the proper channels, so that gas engineers could be better informed on appropriate developments.

Mr. H. Moys (West Midlands Gas Board) said that electronics was a rapidly advancing field of engineering, and it behoved them to see whether there were worth-while applications to gas production, distribution, sales, and, for that matter, accountancy. To the expert electronics engineer the paper might appear elementary; but the author had succeeded in giving them much information in readable form. One of the troubles in modern life was that each branch of engineering was becoming so specialised, that the outsider hesitated to break into circles of specialists. One application of photo-electric cells in the gas industry to which Mr. Rimmer had not made reference was that for measuring the sulphuretted hydrogen content of purified gas. A sensitised paper was exposed to the gas for a definite period of time, and the intensity of the stain measured by a photo-electric cell. The paper was changed at regular intervals. This apparatus would, he was sure, come very much to the fore in the future. It was certainly a most valuable piece of equipment. Photo-electric cells had also been employed for measuring quickly the intensity of stain from sulphuretted hydrogen papers used on the G.L.C. apparatus.

Absence of Inertia

One of the advantages of electronics appeared to be the complete absence of inertia. This was excellent for measurement purposes, but he imagined that for control purposes, where the mechanical side had to be introduced, inertia would reappear, possibly to the same extent as with purely mechanical apparatus. Thus Mr. Rimmer's governor was extremely sensitive, but he assumed it had got to move a butterfly valve, and automatically the sensitivity would be reduced. If it was possible to develop controls with such fine sensitivity, by what means were they going to measure those actual variations in pressure?

The development of large works led to extensive conveying and handling equipment, and his experience of sequence control had been a little disappointing. He had had the advantage of many talks to Mr. Rimmer on electronics, and he knew that the author had considered the possibility of adapting the piezo-electric crystal for the determination of calorific value. Could Mr. Rimmer enlarge on this possibility, which seemed good in that it would probably work on crude gas, and must certainly reduce the time lag.

The author had mentioned the ultra-sonics, and he (the speaker) believed that there was a field here for dust removal. There was a reference to the use of ultra-sonics for fluid-flow measurements, and he understood that turbulence did not affect the accuracy of measurement. This would seem to offer some application in the gas industry on works where there were many sets of purifiers, and due to the complicated connections it was not possible to fit orifice plates, as the necessary straight lengths were not available.

Mr. K. L. Pearce (Derby) suggested that the question of the adaptation of electronics to the gas industry must depend on each individual case. What would be to the advantage of large works would not necessarily be good for small undertakings. They had also to consider maintenance, which could be an appreciable item, even in the radio-control phase. He could see a great field in the development of the application of electronics in the gas industry provided it was adapted at a reasonable cost. Incidentally, they had been using the radio-control phase for servicing for some time, and it had proved quite a useful tool.

Mr. Rimmer, replying to the discussion, said that Mr. Milne had raised the question of reliability of electronic equipment, and had suggested that industrial electronics should be removed completely from the environment of radio. While Mr. Milne's remarks were appreciated in this respect, he felt that wherever electronic equipment was utilised in industry, whether it was radio or television, then it must be classed as industrial electronics and designed accordingly. This question of reliability was of prime importance; but the reliability of a radio or television set should not be under-estimated. Mr. Green had referred to automatic control for gas-making, and had suggested as an application the control of the variables of coke and steam. This would, without doubt, call for a computor type of controller, together with servo-mechanisms for operating the prime variables. The question of maintenance and reliability had also been raised by Mr. Green. It was not intended at this stage to go into the pros and cons of the setting-up of an electronic department, but rather to supply equipment which could be readily interchanged and serviced by the manufacturers. The operating costs of electronics were usually of a small order and relatively insignificant.

Useful Over-Elaboration

The question of introducing relatively simple applications in the first instance had been raised by Mr. Lawrence—a process with which he was in complete agreement, and which the West Midlands Gas Board was endeavouring to carry out. In regard to calorific value control, it was not quite clear whether Mr. Lawrence meant mixing control, or gas-making control as mentioned by Mr. Green. In any case, the difficulties were purely a question of time-lag. The servo-mechanisms and computors for these jobs were relatively simple. Mr. Lawrence had also spoken of over-elaborating control by the use of electronics. One might think this the fashion today, but very often the results of elaboration were informative and provided experience which otherwise could not be obtained. It was not proposed that electronics should replace satisfactory existing practice; but there was no reason why experience should not be gained, even in some of these cases. The rate-of-change control had been mentioned by Mr. Lawrence, and in this respect he pointed out that there were many controllers on the market today, both electronic and otherwise, which provided linear control, together with first differential and integral action. If rate-of-change control was being considered, it must be appreciated that an equation lost its sine when differentiated; consequently it was necessary to provide some directional feature in addition to differential or rate-of-change control.

Mr. Moys had drawn attention to the specialised nature of electronics. This was, of course, fully appreciated, and it was difficult to see any alternative in many branches of engineering to calling on the services of the specialist. The only satisfactory manner of obtaining co-ordination was to have such specialists within an industry. They alone were the people who could hope to see the problem from both sides.

Unlimited Energy

The question of sulphur control in town gas had been mentioned, and the photo-electric cell had been offered as a means of monitoring. As pointed out in the paper, a modulated light source was essential for this work if a high degree of accuracy was to be obtained. Electronics, as Mr. Moys had pointed out, was a means of eliminating inertia. Naturally it could not eliminate mechanical inertia, at any rate at this stage; but surely the question of mechanical inertia was one of energy input. The greater the energy input, the less the effect of mechanical inertia. This was where electronics excelled in providing an unlimited source of energy instantaneously, so that although electronics could not directly alter the inertia of a mechanical part, a sufficient supply of energy could be provided which would materially assist in solving this problem.

The piezo-electric crystal had been mentioned for calorific

value control. This appeared to be a promising application which might be instrumental in reducing the time-lag in measuring temperature changes. Frequently the time-lag was of the order of minutes, but the rate of change could, of course, be measured continuously over any finite period of time. Consequently, if the sensitivity of a temperature measurement could be increased to a very high order, then the rate of change could also be measured over a very small period of time. A crystal might be considered to vibrate against a second crystal and produce a beat frequency which in turn could be vibrated against a third crystal, so that temperature changes of the order of 100th of a degree Centigrade could produce a change of 100% in the beat note. This was only given to illustrate the sensitivity which could be obtained in both temperature and pressure measurement by means of crystals.

Mr. Moys had also asked whether ultra-sonics could be used for detarring. The answer was that ultra-sonics was at present being used for precipitation purposes. When applied to gases, however, there was the problem of creating mechanical vibrations within the gas stream; and although electronics had been used for this purpose, mechanical production of these vibrations had been found more efficient and less costly. Mr. Pearce, added Mr. Rimmer, had referred to the suitability of applications, and he agreed with his comments.

Mr. A. Allen (General Manager, Warwickshire Division), in proposing a vote of thanks to Mr. Rimmer, said that the author had put his subject over in a disarming way. They certainly could not afford to ignore the use of electronics in the gas industry.

Mr. S. C. Bentley (Oxford) seconded the vote and **Mr. Rimmer** briefly replied.

BRISTOL GASHOLDER FOUNDATION TANK

WE published in the 'JOURNAL' of December 9 (p. 674) the paper on 'A 6 Million Cu.Ft. Gasholder Foundation Tank at Bristol' by T. Alun Hughes and F. W. Turner, which was presented at a joint meeting of the South Western Section of the Institution of Gas Engineers and the South Western Association of the Institution of Civil Engineers at Bristol on December 2. The meeting followed an inspection of the Stapleton Road works of the South Western Gas Board, and was presided over by the Chairman of the South Western Section, Mr. C. R. Ingham. The paper was introduced by Mr. F. C. Eales, London Manager of A. Monk & Co., Ltd., of 75, Victoria Street, S.W.1, who explained that since collaborating with Mr. Turner in writing the paper Mr. Hughes had left for Canada. After the introduction, Mr. Turner amplified the paper with a considerable number of lantern slides. Our report of the discussion on the paper follows.

Dr. A. Marsden (Area Scientist, South Western Gas Board) said the difficulties encountered in carrying out the work had been described very fully, but there were one or two minor points worthy of elaboration. His own interest in the paper was concerned mainly with the nature of the ground and the trouble met with during the construction of the tank. Perhaps the most important point was the effect on the concrete of the high sulphate concentration in the subsoil. Various representative samples were analysed by the Gas Board's chemists and the sulphate content was calculated, with the results described in the paper.

The so-called black earth reached the very high figure of 440 parts per 100,000. Perhaps it might also be recalled that air-dried clay containing more than 2.2% of sulphate as SO_3 was looked upon as needing precautionary measures. While so far as he could see little or no danger need be looked for from the marl rock, the town refuse constituted a real menace. In addition it would appear that at any rate in the lower levels of that big hole anærobic bacteria were at work, accompanied by obnoxious smells, which, in turn, by oxidation, could lead ultimately to a more rapid transfer of sulphate to the subsoil water.

One of the most interesting things from the chemical point of view was the action of the spring water on the cement. It was extraordinarily high in bicarbonates, and in order to satisfy its demand for some alkali it proceeded to attack the lime in the cement, and they had been told in the paper how the difficulty had been overcome. The authors had provided one of the reasons for the use of bituminous coating and asphalt, but he thought there were also other reasons. The collaboration between the Board and the contractors was one of the most pleasurable features of the work.

Mr. W. Willis (Bristol City Engineer's Department) commented on the fact that before any work was done on the site the ground was sampled and tested for the presence of SO_3, with apparently negative results, but subsequently it was found to be present, and its presence was deemed to be due to oxidation of the filling material. It was not clear whether the filling material referred to was decomposed town refuse. They were told that the filling taken from pit was used as over-site filling and that the water cleansing building was constructed on it and piled foundations driven through it. Were any precautions taken to safeguard the concrete piles from any action from the SO_3?

Dr. Marsden said SO_3 was present as sulphate. One trouble with refuse which contained sulphur compounds was that at a certain depth the bacteria reduced the sulphate to sulphides, thereby causing a smell, and when exposed to air they oxidised back to sulphates. The method of protecting the cement or concrete from the attacks of the sulphate, which tended to form crystals inside the concrete, was to use bituminous coatings and asphalt. The piles for the water cleansing building were not liable to attack, and therefore the question of precautions did not arise.

Mr. Turner explained that the piles referred to were precast, from a good quality mix, which made them resistant to attack, in accordance with advice from the Building Research Station.

Mr. A. C. Rea (Bath) said that when foundations for vertical retorts were put in at Bath they were confronted with a high sulphur content in the ground, and they decided that it was advisable to use ciment fondu. It appeared from the paper that a lot of improvisation was necessary on the Stapleton Road site and he thought all concerned were to be congratulated on having overcome the snags.

Mr. A. G. Holtam (Cheltenham) asked whether the drainage holes round the perimeter were stopped up. It was stated in the paper that it would be necessary to empty the tank occasionally during the construction of the holder, and as there would probably be a period of two and a half years before the holder was completed he wondered whether the drainage lines would keep clear all that time.

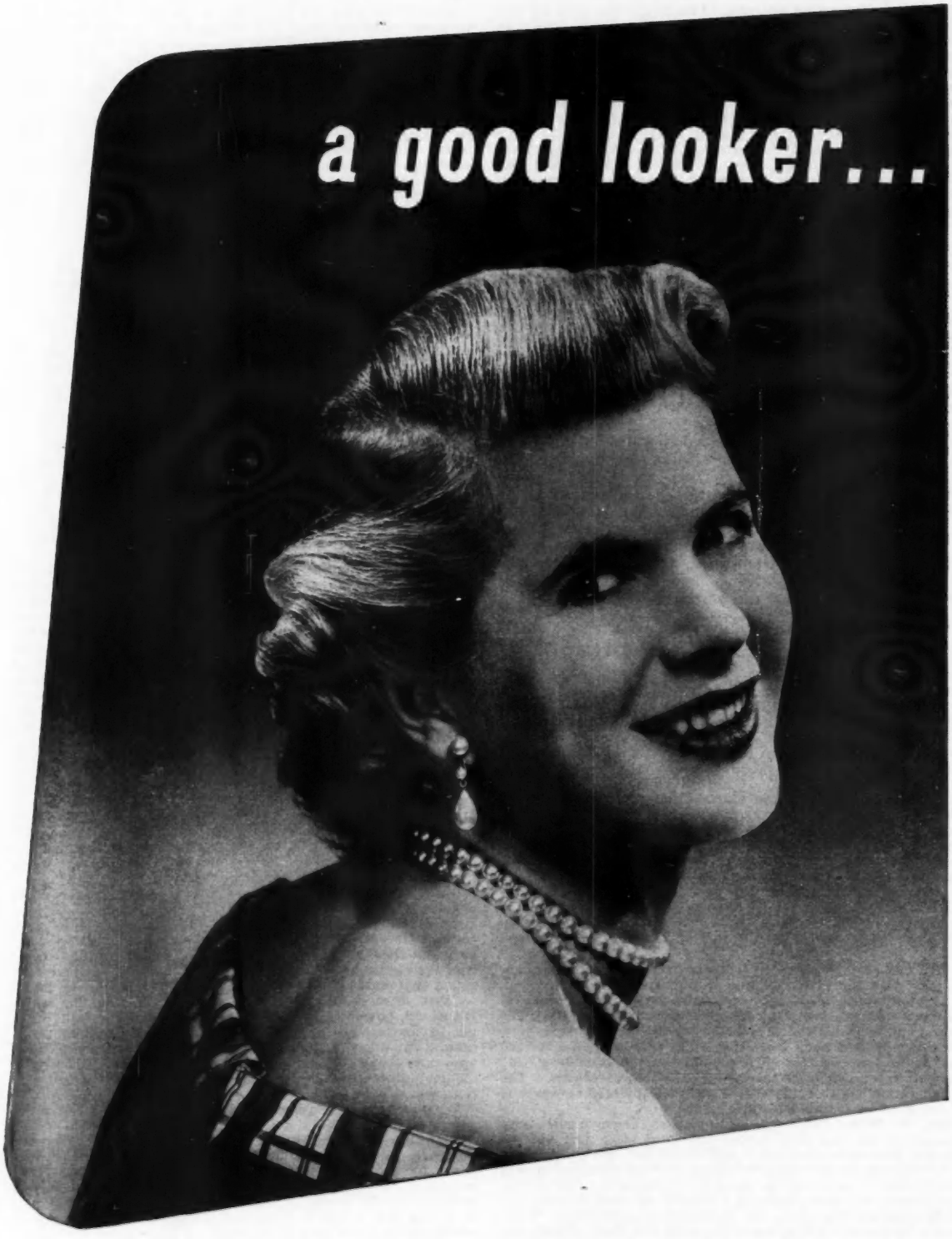
Mr. Turner replied that water would not reach the internal dumpling because it would be drawn off before it got there. Externally they had found from experience on the job that the water percolated easily through the ground. He did not anticipate any such trouble as Mr. Holtam indicated.

Mr. E. Jones (Bristol) said the chemical attack probably took two forms. First, there was the possibility of CO_2 forming carbonates in the water and attacking the cement in its 'green' state and leeching it. When once the cement was set, any carbonate formed tended to seal the surface and the trouble did not recur. Secondly, there was the sulphate content of the water which, in the long term, was the more important. It might take years before either form of attack became manifest because of the slow growth of the crystals.

Mr. Fairbanks (Bath Waterworks) said that from the water engineer's point of view it would be very unusual to have so large a container made in circular form; generally they were rectangular. It seemed to him to be wrong to start with the idea that they could not make concrete watertight, and therefore they must line the foundation with asphalt. It had been stated that back-filling was done before the tank was tested so that there should not be so great a stress on the walls. He would, however, be loath to back-fill round the walls without having first made sure there was no leak. It would be of interest to know how the responsibility for the design was apportioned. He gathered that the contractors who designed the tank were contractors who submitted designs in competition with others.

What were the relations between the Gas Board and the contractors—was there a bill of quantities?

Mr. Eales said that so far as the contract was concerned there was no bill of quantities, but one was, of course, prepared for the contractors' own use. The contract was for a lump sum, based on competitive design and construction. With reference to the design of the tank he believed he was right in saying that unless a tank was going to be prestressed it would not be made circular in shape. That was not necessarily true because there were many tanks built before prestressing was employed. Considering the total cost of the job it was not necessarily true that prestressing could show an economy compared with other methods. The shuttering was common to more than one method, but the degree of control to obtain the necessary strength for prestressed concrete was greater. The means of placing the concrete had to be considered, and he felt that the designer originally made a wise decision to employ normal reinforced concrete on that particular site.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Consultative Council Meetings

NORTH WESTERN

Gas Coal Too Dear

THE North Western Gas Consultative Council, which has spearheaded a consumers' campaign for coal to the gas industry to be made cheaper, has persuaded the Minister of Fuel and Power to discuss the issue with chairmen of gas consultative councils throughout the country at their next joint meeting.

Announcing this development at a conference with local authority representatives in Manchester, called to discuss the annual report of the North Western Gas Board, Alderman C. E. P. Stott, Council Chairman, said coal used for carbonising was now the highest priced coal and steps must be taken to reduce the cost at an early date.

In their talks with the Minister of Fuel and Power, the gas consultative council chairmen would draw attention to the important contribution coke had to make in the drive to beat the smog menace—a contribution which could be made all the greater if the price of coal to the gas industry was made cheaper.

The coal price structure on which increases were calculated on a percentage basis hit the gas industry unfairly.

Mr. W. Hodkinson, Chief Technical Officer of the Board, told the conference that the whole of the £1,750,000 saving in production costs achieved by the Board since 1949, had been absorbed in coal price increases.

The conference agreed that consumers must be left free to choose between electricity and gas. Its attitude towards this issue was made clear after Councillor Edge, of Failsworth (Lancs.), had complained that when he went along to his local electricity department, having decided on a change from electricity to gas, he was asked: 'Why are you changing to gas? You will regret it.'

The public wanted service and not an instruction on what they should do in their own homes, declared Councillor Edge.

Alderman W. Onions, Chairman of the Consultative Council's East Committee, told the conference: 'The consumer should decide whether to choose gas or electricity, whichever he thinks is the most economical and the best proposition.'

EASTERN

Industrial Sales

AT a meeting of the Eastern Gas Consultative Council in London, on November 16, the Chairman of the Eastern Gas Board, Sir John W. Stephenson, C.B.E., reviewed the Board's fourth annual report and accounts.

On the Council's concern at the increase in competition from oil, particularly in the industrial field, Sir John said with the shortage of solid fuel and oil during the war years, many industrial and commercial loads were accepted by the gas industry which in an unrestricted fuel market might well have gone to oil.

'With the greater availability of supplies of oil, there is a tendency towards a movement in the other direction. There is no question, however, of any wholesale changeover taking place, and the Board's industrial departments are confident that the amenity value of gas and the service the Board is able to give will continue to enable them to maintain and further the upward trend of industrial sales,' he said.

The Council had given a great deal of attention, following the report of the Ridley Committee, to the question of freedom of choice between gas and electricity on new housing estates. It might well have thought that its efforts had been of no avail. The Chairman, Alderman R. Turner, said he was not unhopeful that this problem would be handled in an effective manner and in a way best calculated to achieve the principles involved and to serve the best interests of the consumer.

The minutes of the meetings of divisional committees were received by the Council. The Watford Committee had passed a resolution sympathising with a consumer who complained that on making application on the Board's form for a gas supply by quarterly meter, he found he was ordered to pay £3 'as guarantee for due payment of quarterly accounts' and on the same document was asked to sign a statement that he would undertake to pay the charges as they became due. The Board had said it was customary to ask new consumers who required a quarterly meter to give a reference, preferably from a gas or electricity board. Had he given such a board's name, he would not have been troubled further. The consumer had been dissatisfied with the answer.

The Norwich Divisional Committee, in a minute concerning the Board's approval of an extension of mains to supply 2,311 houses at Norwich, asked if the Board had satisfied itself that in the face of present intensive electrical competition, the project would be self-supporting. The Board replied it was satisfied from the information before it that the project would be of benefit to the Board and to consumers generally. Before the Board committed itself to any capital expenditure it considered the economics of the project very carefully.

SOUTH WESTERN

Publicity to Improve

THE ALLEGATION that the publicity work of the South Western Area Gas Board was not being done as effectively as it ought to be was made by Ald. H. T. Bush (Cheltenham) when the South Western Gas Consultative Council met at Taunton on December 2.

Mr. L. G. Northcroft (Cheltenham) referred to the proposed visit of Mr. C. H. Chester, the Chairman of the Board, to speak to the Council on plans for strengthening relations with the public and improving advertising generally. After saying he regretted he could not be present next week, Mr. Northcroft contended that although the Board was accustomed to exhibitions and other activities they had never woken up to the full importance of general publicity. Ald. Bush produced an extract from the Board's minutes relating to the Council's request for a public relations officer. He declared: 'It is a most deplorable minute. There are 182 words and 13 commas all in one sentence; it is deplorable grammar. It makes you despair of any effective publicity matter being put over.' He also complained that the Board spent less on printing, stationery and publicity than any similar board in the country, which he thought was significant. 'The job is not done as effectively as it ought to be,' he declared.

A questionnaire to 245 applicants on the housing waiting list of Chard Corporation revealed that 81 preferred electricity and 80 gas; 50 expressed no preference and the others did not reply.

After considering a letter from the Western Regional Committee of the National Council of Women, the Council unanimously agreed that a committee ought to be set up to study gas and electricity tariffs as recommended in the Ridley Report. The resolution is to go to the National Council of Women, the Board, the Minister of Fuel and Power and other consultative councils asking for their support. The letter asked for a review of gas and electricity tariffs because, the Committee claimed, they 'encouraged extravagance by suggesting it is cheaper to burn a quantity than a little, as by doing so it brought down the average price of each unit'; because they were unfair, since users of both gas and electricity were penalised through paying in both cases at the heaviest rate; and that the second point tended to drive consumers to instal electrical appliances only. This tended, the Committee added, to create a monopoly for electricity boards and a source of grave difficulty in a national emergency.

A reply from the Board was produced. This stated that the normal commercial principle of 'the more you buy the less you pay for it' had operated almost from time immemorial, but this was by no means the main principle on which the Board's tariffs were based. The standard costs of making a gas supply available were covered broadly in the early blocks of the tariff, which were, therefore, somewhat higher than the later blocks. The Board could not agree that the tariffs encouraged extravagance. In certain circumstances, the Board were under a statutory obligation to supply gas, although very small consumptions were not remunerative.

Mr. L. G. Northcroft (Cheltenham) said the Ridley Committee recommended an investigation of gas and electricity tariffs on a national basis, but he believed it was turned down owing to pressure from both sides against 'outside interference in financial affairs.' He, however, thought it would be a good thing if an outside body did interfere in that matter.

A further meeting was held on December 9, when Mr. C. H. Chester, Chairman of the Board, reviewed the annual report and accounts. While the consumer had had to face an average

increase of 4d. per therm since 1949, he said, improved efficiency, more intensive sales efforts, and greater economies had saved him from having to pay nearly 3d. more for his gas. The Board had achieved, during the year under review, by installing modern plant and improving Works practices, an increase in thermal yield of 0.8 therms per ton of coal carbonised, or a saving of upwards of 17,000 tons of coal a year. Over the whole period since vesting date the thermal yield has been increased by two therms per ton of coal, giving an annual saving of 40,000 tons of coal, representing £85,000 a year. By the time the Board hoped to have its integration scheme completed in 1960, there would only be about 20 major manufacturing stations in the area. Of the 105 works it originally took over, it had already closed down 13, and would have closed down a further 15 by the end of the year, making 28 mainly small, uneconomic, and some inefficient works closed down by March 31, 1954.

The Board had so far approved production projects amounting to over £7 mill., of which £4 mill. had already been spent. The main project was the new works at Stapleton Road, Bristol, which would be in full production late next year. The new works would give a thermal efficiency of 85% from coal, representing a saving of 33,000 tons of coal a year at that works alone and also guarantee a constant supply of uniformly graded coke.

Except for Newent, Uffculme, Callington, Gunnislake, and St. Just, the Board now had a declared calorific value of 470 B.Th.U. throughout the area. The places mentioned were small isolated units where gas/air plants would soon be in operation; in fact, St. Just had recently started.

During the year 13,278 old and inefficient cookers were replaced mainly by new cookers supplied by the Board. Owing to the hire purchase restrictions on water heaters then in force, the Board introduced a simple hire scheme, as an addition to the normal purchase and hire purchase facilities. The results were staggering. Daily queues in the showrooms were such that they could hardly cope with the rush. In the three months after the scheme was introduced last July, 14,000 water heaters were installed. The Board had budgeted to install 100,000 water heaters over the next five years. The rush to the showrooms stimulated the demand for other gas appliances, but with a reduction in purchase tax and the removal of hire purchase restrictions on other appliances, such as fires and refrigerators, there would be further spectacular results.

Turning to publicity policy and activities, Mr. Chester said he understood that the Council felt that the Board's policies and ultimate aims and objects were not explained to the general public, and that the Board was too remote and ought to have public relations officers. Although it had no specifically designated public relations officer, by and large a very considerable effort was expended in bringing the Board's activities and services constantly to the public notice.

The Board was not convinced that any appointment of a specialist public relations officer, bearing in mind particularly the cumulative cost of an effective public relations department, would add anything appreciable to what was already being done.

No less than 325,000, or 55% of the Board's 590,000 domestic consumers, used less than 30 therms a quarter. Some 11% of these only used up to 10 therms a quarter, and were definitely unremunerative to the Board and did not even pay for the cost of reading or emptying the meters, apart from all other overheads. In fact, only where the consumption exceeded 30 therms a quarter did the Board begin to show a profit on the domestic tariffs, and that was why, at that point, the domestic tariffs showed a material drop and a promotional incentive to use more gas at lower prices.

Mr. H. Morland (Glastonbury) said the Council felt the Board's publicity had not been 'getting over.' A canvass of tenants of a council estate showed equal preferences for gas and electricity for cooking, but on an estate that had had gas cooking well over 90% chose gas. Such facts had not been sufficiently publicised.

Mr. Chester pointed out that the embargo on promotional advertising was only lifted last July.

Mr. Morland said it was a matter of public relations which, beyond a salary, should cost nothing. In the South West some Board officials did their publicity better than others. Many members of Glastonbury Town Council had the idea when the gas industry was nationalised that the cost of their street gas-lighting would 'go right through the roof,' but it had risen less than any other Corporation service. The Board was doing a very good job, but the public still did not understand the benefits of using gas.

Mr. Chester said they were selling four times as much fuel and power as their competitors, and their figures compared more than favourably with every other area board in the country. Today the Board was getting far more letters of commendation than condemnation.

Mr. J. D. Duncan (Wells) said the Board could be rightly proud of its achievements, and possibly a public relations officer could eliminate a lot of the present 'ignorant criticism.'

Mr. R. L. Liney (Teignmouth) said there should be a clearer personal message from the Board to prospective users of gas.

Mr. Chester said every one of his area managers was a public relations officer and knew his job. Perhaps if he called his advertising department a public relations office there would be no complaint.

EAST MIDLANDS

Reversing the Price Trend

THE East Midlands Gas Consultative Council at a special meeting at Nottingham on December 9 unanimously approved reductions in the price of gas to 40% of the domestic consumers and to a large number of industrial users throughout the area. The changes, to take effect from January 1, will cost the Board £160,000 per annum.

Mr. Sydney Smith, Chairman of the Board, said the Board had decided to attempt to stabilise prices: (a) By meeting increased costs without having recourse to increases in gas prices; and (b) by modifications in the tariff structure, by way of price reductions which would more closely relate prices and costs for certain groups of domestic and non-domestic consumers.

Large and small consumers would benefit from the decision to stabilise prices and a percentage of consumers would further benefit from the changes proposed. These were consumers in both the domestic and non-domestic fields who used relatively large quantities of gas; or, alternatively, those who, by reason of their good load factor, actually warranted a modified price. Price reductions proposed for the second and third blocks of the domestic tariff would encourage consumption by all households using above-average quantities of gas. It was important that consumers with a cooker and wash boiler who also used gas for water heating, space heating or ignition of solid-fuel grates, should be encouraged to use these appliances to the fullest extent, and also that the effort now being devoted to the sales of these appliances should be firmly supported by the offer of more economical running costs.

On the industrial side, consumers whose business was especially valuable by reason of their load factors, and who were, at present, given no price advantage, were firms operating continuous processes for a 24-hour seven-day working week. These firms were highly economic to supply as they occasioned no additional gasholder capacity, and allowed fuller use to be made of the distribution system. Their load was also relatively stable throughout the year, with the result that they did not aggravate the problem of supplying the winter peak demand.

In brief, the proposals were: (a) A 5% reduction in the price of the second domestic block (31-60 therms a quarter) in all price zones; (b) a 10% reduction in the price of the third (open) domestic block in all price zones; and (c) a load-factor discount of 10% on gas used by continuous-process firms, subject to certain conditions.

The proposed price concessions would enable the Board's sales staff to give economy of fuel cost a more important place in their sales campaign than was possible at the moment; and the great efforts now being made to expand sales of water heaters (now freed from hire-purchase restrictions) would be strongly supported by an offer of cheaper gas.

Industrial sales, while still expanding, showed some slackening off in the rate of growth. In part this was due to general economic conditions, but part could be explained by the present structure of the non-domestic tariff. When this tariff was designed, the Board was precluded, because of the coal shortage and of restrictions on capital development, from having promotional tariffs, with the result that business which could have been gained had not been gained and certain consumers were actively considering a change in their fuel allegiance. It followed, therefore, that some readjustment was necessary to deal with these changed conditions, for any lack of balance in the sales of gas would have a distorting effect upon the economy of the Board's organisation, and could result in drastic price alterations for the domestic consumer. The proposals were designed to lead the way in reversing these dangerous trends, and to stimulate gas sales in those sections most subject to the pressure of costs.

Good industrial loads were recognised by the present block structure of the non-domestic tariff. Bigger loads would permit a more economic utilisation of production capacity, and hence should be rewarded by passing back some of the

economic gains to the large consumer. As a first step to encourage consumption, it was proposed to give discounts to those consumers who had the type of load which secured economies in production. The proposal was to give a 10% discount off the present published price in each block in the non-domestic tariff to those consumers using gas continuously. The justification for the discount was that the continuous-process loads helped to fill up the daily and weekly 'valleys' of production, and as the gas was used continuously little or no gasholder capacity was needed to meet the demands of these consumers. From an examination of non-domestic consumers it appeared that those most likely to qualify for the discount would be, in the main, glass and pottery manufacturers. The total consumption of all the firms concerned was approximately 6,250,000 therms a year and the amount of revenue lost initially would be approximately £22,000 a year. Since the introduction of special contracts for large consumers, certain additional firms had qualified for the special contract prices, and this had materially affected the extent of the concessions estimated at that time.

Mr. Smith said he was not going to pretend that the reductions would mean a substantial cut either in the cost of living of the average household or in the total operating costs of factories. They would perhaps enable the householder to use just that extra bit of gas which comfort or convenience demanded. They might also play a small part in cutting operating costs of certain factories, some of which, particularly those engaged in the export markets, were faced with highly competitive conditions.

'Against the background of our general economic situation, these reductions may at first glance appear of small moment,' continued Mr. Smith. 'They seem perhaps merely a couple of pebbles removed from the dangerously sloping beach of inflation, but they are, in reality, far from unimportant. This action is of more than local significance. Its effect could vastly transcend the immediate and relatively modest benefits which will accrue to a number of domestic and certain non-domestic consumers, for it reverses the terrifying trend of ever higher and higher prices.'

They had been told by politicians and economists that a halt must be called to rising prices if they were to ensure economic prosperity. 'We know they are right, but we have also seen how little heed is being paid to their warnings. This action of the Board may at least show that nationalised industries are also aware of the need to check the rise in the cost of living. It may do more; 5% or 10% reductions in sections of our tariffs will not solve the country's economic problems, but 5% or 10% reductions in the fuel costs of goods and services generally might well go a long way towards doing so.'

Alderman C. R. Bates, Chairman of the Consultative Council, said the Special Purposes Committee had unanimously agreed to recommend acceptance of the proposals. So far as he knew, the East Midlands was the first Board to introduce reductions in tariffs.

At a subsequent Press conference Mr. Smith said the consumers taking less than 30 therms per quarter would not benefit, but taking the area as a whole, the consumer burning 40 therms per quarter would save 8d.; 50 therms per quarter, 1s. 4d.; 60 therms, 2s.; 70 therms, 3s. 2d.; 80 therms, 4s. 5d.; 90 therms, 5s. 7d.; and 100 therms per quarter, 6s. 9d.

In answer to a question 'Why is this happening here, and not in any other part of the country?' Mr. E. H. Harman, Deputy Chairman, said 'We can tell you why we are doing it, but we cannot tell you why the other boards are not doing it.'

Pressed for figures relating to the effects of the changes on the average household, Mr. Smith said there was no such thing as an average household. Two families of identical size living in exactly the same type of house might have entirely different habits and their gas consumptions would bear no resemblance.

Mr. Smith said the lifting of hire purchase restrictions from water heaters had been followed by a greatly increased sale of such appliances, and the Board hoped that many of the 60% of the consumers now using less than 30 therms per quarter would join the 40% who were to benefit from the reductions in gas prices.

WEST MIDLANDS

Birmingham Experiments

FURTHER particulars of the experiments being made in Birmingham in the production of gas from oil without using coal or coke were given by Mr. G. le B. Diamond, Chairman of the West Midlands Gas Board) at a meeting of the West Midlands Gas Consultative Council in Birmingham on December 7. Alderman W. H. Malcolm presided.

In reply to a question by Mr. J. Fallon (Smethwick), Mr. Diamond said the development arose from some thoughts that the Board had back in 1950. It was evident then that coal supplies for carbonisation were going to be difficult. The Ministry of Fuel and Power had frequently said that coking coals which came from Durham would become exhausted in time and the coking and gas industries would have to look to other coal fields for supplies and they naturally thought those coal fields would include North Staffs, East Midlands, Yorkshire, and the West Midlands, from which supplies were traditionally drawn. London drew its supplies mainly from Durham and no doubt would also have to look to other coal fields for gas making coal.

They thought something could be done about manufacturing gas from black oil. They had now successfully gasified heavy oil in a large carburetted water gas plant by thermal cracking, and it was that which the Minister had come to see on the previous Friday, when he visited Saltley gasworks.

Mr. Diamond also referred to experimental work at Solihull, which it is expected will be brought to a successful and practical conclusion during 1954.

[*A description of the Saltley process will feature in an early issue of the* 'GAS JOURNAL.']

WALES

Manager's Mayoral Expenses

A PROPOSAL by the Wales Gas Board to make a grant in aid of a manager's Mayoral expenses was discussed at a meeting of the Wales Gas Consultative Council at Cardiff on December 9. Alderman G. F. Hamer presided.

Mr. T. Mervyn Jones, Chairman of the Board, said that after the Board had agreed in principle to the making of a grant it received a notice of motion from Alderman Hamer that the decision be rescinded, but as it was not seconded it lapsed. Last month the Board accepted a recommendation from its executive committee that a grant of £50 should be made, only Alderman Hamer dissenting.

With matters of much greater magnitude requiring the attention of the Council and the Board, it was inconceivable that the two bodies should not be able to reconcile their views over a much smaller matter. Indeed, it was of the utmost importance that the two two bodies responsible for the gas industry in Wales should purposefully collaborate in the development of the industry. 'With this in mind,' said Mr. Mervyn Jones, 'I am authorised by my colleagues to say that they are prepared to abide by the views of the Council on the points to be considered. If, after consideration of the circumstances, the Council is not willing to support the Board in its wish to make a small grant of assistance to the Manager concerned, the Board for its part does not intend to pursue it any further, notwithstanding its opinion of the matter.'

In this consultation and with the object of confining the present discussion to what would appear to be the relevant points, the Board wished to put two matters to the Council and to receive its views thereon. As a matter of general principle, did the Council think it undesirable that the Board should make any payment (the amount, of course, being reasonable) by way of assistance or recognition to an employee of the Board (whatever his status in the industry) who might become the Mayor of his Borough or Chairman of his Council where such honour involved the employee in personal expense?

The Board did not encourage employees to serve on local Councils, nor did it discourage them. The Board considered that it would not be in the interest of Wales if Local Government were to be denied the services of the section of the community represented by employees of the Board and similar organisations. Nevertheless, it should be borne in mind that only a very small percentage of the Board's employees, totalling 4,640 in all, had in fact served on their local councils. In May, 1949, when 108 company and municipally owned gas undertakings were vested in the Wales Gas Board, there were nine employees so engaged; at the present time they numbered 12.

The second point was whether, in the particular case, it was the view of the Council that the £50 (or a proportion) should not be paid by the Board when such a payment was being made in order to honour an arrangement which the Board understood from the former directors of the company would have obtained were they still in office.

The former directors of the company, three men of substance and integrity, had informed the Board, in writing, that, had they been in control when the official was appointed Mayor of his Borough, they would have made a grant of financial assistance towards expenses which he must necessarily incur while in office.

The Board was required by the Gas Act, 1948, to see that employees were treated no less favourably by reason of the nationalisation of the industry and

to follow the customary practice of the former owners. It was submitted that, quite reasonably, the decision on the grant in question might be governed by the similarity of the circumstances; in the opinion of the Board, the decision taken was not only an appropriate one but one which should not be avoided if regard was to be had for an undertaking between an employee and his former employers.

'The Board still says that in its view this is a matter of management for the Board itself to decide, but if the Council feels that the payment should not be made the Board will not make the payment. If, on the other hand, the Council in all the circumstances think with the Board that it is proper payment in keeping with an honourable obligation, then the payment will be made.'

After discussion the Council adopted a resolution which stated: 'The question of a grant must be regarded as opening the field to a very undesirable and dangerous practice for which there is no known precedent in nationalised industries. The Council sees the possibility of abuse and favouritism, and is unable to approve the principle of the Gas Board undertaking what is obviously the responsibility of the borough council. It decides not to approve the grant.'

News in Brief

The Dundee Group of the Scottish Gas Board staged a very successful one-day exhibition of modern gas appliances in the Marryat Hall, Dundee, on December 10. Cookery demonstrations were a strong feature of the event.

Epping Auto-shunter. — F. E. Weatherill, Ltd., manufacturers of the 'Weatherill' range of hydraulic loading shovels, have been appointed main distributors for Great Britain, and all territories overseas for the 'Epping Auto-Shunter' which was successfully introduced by the manufacturers, Epping Engineers, Ltd., six months ago.

A Modern Showroom advertising Calor gas equipment has been opened at King Street, Stenhousemuir, by Russell's Farm Products, Ltd., dealers for Stirlingshire for Calor gas. At the opening, Mr. Findlay Russell said that four years ago there were about 25 regular users of Calor gas in the area. The firm was now responsible for servicing about 800 regular gas customers. He claimed that the system could be maintained on terms highly competitive with those for coal gas installations. Mr. A. A. Tabor, General Manager of the Calor Gas Co., pointed out that his firm's product was the only fuel which was sold at the same price all over the country.

Malicious Damage to street lamps and equipment is costing Liverpool ratepayers as much as £4,000 a year. Alderman A. Critchley, Chairman of the City Lighting Committee, stated recently that the most important aspect of that damage was its extremely adverse effect on operating efficiency. In some areas it was almost impossible to maintain any form of lighting, and every effort to reduce the magnitude of the trouble was being made. The city's installation comprises 34,300 lamps, and 1,000 miles of roadways and passages are lighted. During the last financial year the Corporation used 622,350 therms of gas and 9,103,828 units of electricity, and the costs were £30,417 and £40,395 respectively.

Several Local Authorities in Scotland are considering smokeless zone proposals as a result of representations made by the Scottish Fuel Efficiency Committee and the National Smoke Abatement Society. At least seven local authorities are favourably disposed to the reform, including Glasgow, Edinburgh, Aberdeen, Rutherglen, Glenrothes, Motherwell, and Wishaw, and East Kilbride. Sir Patrick Dollan, Chairman of the Scottish Fuel Efficiency Committee, making the announcement, stated that if Glasgow and Edinburgh were to go ahead with definite schemes they would give a great incentive to other civic authorities to follow their example.

Six Drivers attached to the Peterborough District of the Eastern Gas Board's Cambridge Division have qualified for the awards made annually by the Royal Society for the Prevention of Accidents. They include one woman driver, Mrs. R. N. Dye, who has completed two years on the highways without accident since she was entered for the competition at the beginning of 1950.

The Trade Statistics for September, 1953, issued by the Central Statistics Office in the Republic of Ireland, show imports of 18,617 tons of gas coal, valued at £104,908, all of which came from Great Britain. In September, 1952, the figures were 22,520 tons, valued at £140,626 (all from Great Britain). This brings the total of these imports for the first nine months of 1953 to 196,182 tons, valued at £1,180,584 (all British), as against 208,456 tons, valued at £1,292,592 (203,233 tons, £1,255,955 British) in the corresponding period of 1952.

The Series of Visits arranged for this year by divisions of the North Thames Gas Board to the Edmonton works of R. & A. Main, Ltd., and Main Enamel Manufacturing Co., Ltd., concluded with a visit from the Headquarters Division on December 1. Mr. A. D. Billingham, Manager of the Central Services Section, was in charge of the party which included Mr. A. F. Mayo, Senior Special Services Representative; Messrs. Millard, Summerhayes and Craton, Senior New Housing Representatives; Mr. L. G. Hillyer, Senior Central Services Representative and Representatives from the Central Services, New Housing, Public Services, Catering and Public Lighting Sections.

New Offices for Pollock Brown & Co., Ltd., one of the '600' Group of Companies, were opened by Mr. Harold G. Cohen, the Company's Chairman and a Director of George Cohen, Sons & Co., Ltd., the Group's parent. The new building replaces the offices partially destroyed by bombs in 1941 and stands at the entrance to the Company's Northam, Southampton, scrap-yard.

A Scottish Woman Provost defended gas as the preferred cooking fuel when a proposal was made at St. Andrews Town Council that 58 new houses should be all-electric, including cookers. The Provost, Miss Jessie L. Moir, opposed the proposal. She had asked dozens of women what they wanted and all had preferred gas cookers. When the proposer said he favoured doing something new in a new development the Provost answered 'But you don't do the cooking.' The Council deferred the decision pending further information as to costs.

Mr. Taylor, Chief Instructor of Ascot Gas Water Heaters, Ltd., has completed a series of lectures in the South Western area. At Bristol headquarters of the Northern Division, a class of trainees (recruited from the Labour Exchange for maintenance duties only and with no previous experience of water heaters) were instructed in every phase of construction, maintenance and regulation. A copy of the Ascot Maintenance Manual was given to all trainees and it was adjudged that with a little experience, 88% would make the grade as maintenance fitters. Other lectures were given at Torquay, Paignton, Newton Abbot, and Brixham.

Diary

Dec. 17.—WALES JUNIORS (North): Tour of works of John Summers, Ltd., Shotton.

Dec. 18.—LONDON JUNIORS: 'Coke and the Future,' F. S. Evans, Coke Manager, South Eastern Gas Board; 178, Edgware Road, 6.30 p.m.

Dec. 31.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Dec. 31-Jan. 13.—SCHOOLBOYS' EXHIBITION, Horticultural Hall, Westminster, Gas Council exhibit.

Jan. 1.—INSTITUTION OF GAS ENGINEERS: Christmas Lecture for Juveniles, J. E. Davis, O.B.E., on 'The Movement of Gas,' Sir John Cass College, Jewry Street, Aldgate, E.C.3. 2.30 p.m.

Jan. 4-5.—INSTITUTION OF GAS ENGINEERS: Christmas Jubilee Lecture, Frank Brinsley. Bournemouth Technical College.

Jan. 5.—MIDLAND JUNIOR GAS ASSOCIATION: 'Gas Accounts and Finance.' R. L. Shaw (Dudley); Staff Mess Rooms, Council House, Birmingham.

Jan. 5.—EAST MIDLANDS G.C.C.: Meeting, Victoria Station Hotel, Nottingham, 11.30 a.m.

Jan. 9.—SCOTTISH JUNIORS (EASTERN): Short Paper Day at Dundee.

Jan. 9.—YORKSHIRE JUNIORS: 'The Training of Main and Service Layers,' R. H. O'Neill, Distribution Engineer, Huddersfield/Halifax Group, North Eastern Gas Board. At Wakefield.

The offices of the 'Gas Journal' and 'Gas Service' will be closed for the Christmas holidays from Thursday afternoon, December 24, until Tuesday morning, December 29

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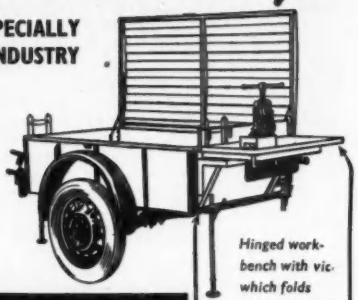

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Quarterly Volumes of the 'Gas Journal'
5/- each, post free
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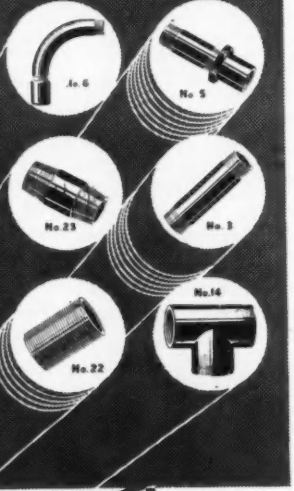

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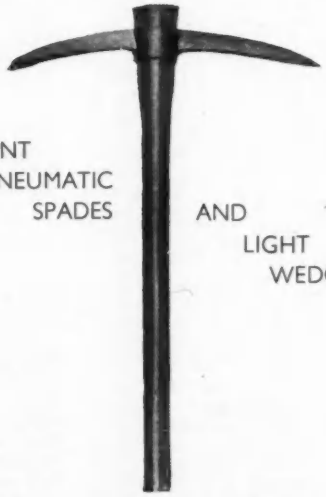

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The " Gas Journal " is published every Wednesday, price **1/3d.**; by post **1/5d.**

Subscription Rates: Home and Empire:—**52/-** per annum; Foreign:—**60/-** per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at **1/9** per line (approx. **7** words)—minimum charge **10/6**. A Box Number address occupies **2** lines, and a further **6d.** is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received **14** days prior to publication if proofs are required. Type area of inside pages **10"** deep × **7"** wide; block screen **120.**

BUSINESS MANAGER : S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. *'Phone:* Harrogate 84291.

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

MORLEY PRODUCTS (PADIHAM) LTD.

JUNIOR REPRESENTATIVES

APPLICATIONS are invited from suitably qualified persons for the position of JUNIOR REPRESENTATIVE in the North and Midlands, also London and the South of England.

The successful applicant will be required to live on the territory, and full details of training and experience should be given, also salary required. A contributory pension scheme is available, and a car provided.

Applications should be addressed to the Managing Director, Victoria Works, Padiham, and the envelope endorsed " Representative."

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE-HEREFORDSHIRE DIVISION
REDDITCH DISTRICT
SHIFT SUPERINTENDENTS

CANDIDATES should possess practical experience in the operation of modern Gas Works plant.

The salary for these posts will be within Grade VII (£545-£625 per annum) of the National Salary Scales for Gas Staffs.

The posts are pensionable and the successful applicants will be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with details of present and previous employment and the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Worcestershire-Herefordshire, Division, 12, St. Nicholas Street, Worcester, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

BIRMINGHAM & DISTRICT DIVISION
ASSISTANT METER SHOP SUPERINTENDENT
LORD STREET, BIRMINGHAM

CANDIDATES must have a wide knowledge of modern gas meter repair shop practice, including *in situ* repairs and testing. The ability to control labour is essential, and a knowledge of costing procedure would be an advantage.

The salary will be within Grade VII (£545-£625 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, present position, qualifications and experience, together with details of any examinations passed, and the names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Birmingham and District Division, Gas Offices, Edmund Street, Birmingham, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

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(SENIOR)

age over 30, required for large constructional engineering company in the Midlands. Wide gas holder and plate-work experience essential. Good opening for right man. Pension scheme.

Write, in confidence, stating age, experience, qualifications and salary required to : Personnel Manager, Box 397, 19/21, Corporation Street, Birmingham, 2.

EAST MIDLANDS GAS BOARD

SHEFFIELD AND ROTHERHAM DIVISION
SENIOR TECHNICAL ASSISTANTS

APPLICATIONS are invited from suitably qualified persons for the above appointments in the Divisional Mains Engineer's Department, to operate initially from Sheffield, at salaries in accordance with Grade A.P.T. VII of the National Salary Scales for Gas Staffs, the maximum of which is £625 per annum. The initial placings on the grade will be dependent upon the qualifications, experience and ability of the successful candidates.

Applicants should have had some practical experience in mains and service work generally and have considerable knowledge of the design of distribution systems, together with experience in the estimation of costs. Preference will be given to candidates possessing a recognised technical qualification.

The posts are superannuable and the successful candidates will be required to pass a medical examination and, unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations 1950, will be required, if eligible, to join the Board's Staff Pension scheme within six months from taking up the appointments.

Applications, stating age and giving details of qualifications and experience, together with the names of two referees, should be addressed to reach the undersigned not later than December 31, 1953.

C. C. WOOD,
Divisional General Manager.

Gas Offices,
Commercial Street,
Sheffield, 1.
December 2, 1953.

(*Classified Advertisements continued on page* 746)

APPOINTMENTS VACANT (ctd.)

SOUTH EASTERN GAS BOARD

APPLICATIONS are invited for the appointment of an ASSISTANT SECRETARY to the South Eastern Gas Board. Applicants should be between 30 and 40 years of age and should have had administrative experience, preferably in the gas industry or in a large commercial or industrial undertaking. The salary payable will be within the range of £1,250 to £1,500 per annum, the starting point within this range depending on experience and qualifications. The appointment will be pensionable.

Applicants should write giving full particulars of their education, qualifications and experience, to the Secretary, South Eastern Gas Board, Katharine Street, Croydon, marking their applications 'Assistant Secretary'. Testimonials should not be sent, but the names of two referees may be given. The closing date for applications is January 7, 1954.

SCOTTISH GAS BOARD

LANARK COUNTY DISTRICT

ASSISTANT DISTRIBUTION ENGINEER

APPLICATIONS are invited for the appointment of ASSISTANT DISTRIBUTION ENGINEER. Applicants must be experienced in all branches of gas utilisation and distribution and have a thorough knowledge of high and low pressure gas transmission, service work, and the fitting and maintenance of appliances. Sound organising ability is essential.

Applicants must possess recognised technical qualifications, preference will be given to those holding the Institution of Gas Engineers' Higher Grade Certificate for Gas Supply.

Salary will be in accordance with Grade A.P.T. VII Scale, £545-£625, with placing on scale according to qualifications and experience. A house will be available at moderate rent.

Applications, together with the names and addresses of three referees, should be lodged with the undersigned not later than Saturday, December 26, 1953.

JAMES M. DOW,
Divisional Controller.

Divisional Offices,
Bothwell Road,
Uddingston.
December 7, 1953.

WALES GAS BOARD

ENGINEER AND MANAGER

PEMBROKE DISTRICT UNDERTAKING

APPLICATIONS are invited for the position of ENGINEER AND MANAGER of the above Undertaking.

Candidates for the appointment must have had administrative experience and possess appropriate technical qualifications.

The commencing salary will be within the range £900-£1,000 per annum, in accordance with qualifications and experience.

The successful candidate will be required to pass a medical examination and join the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, together with details of present and previous appointments, and names of two referees, should be received by the undersigned not later than December 30, 1953.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

WALES GAS BOARD

NEATH UNDERTAKING

ASSISTANT ENGINEER & MANAGER

APPLICATIONS are invited for the appointment of ASSISTANT ENGINEER & MANAGER to the Neath Undertaking, which has an annual output at present of approximately 850 million cu. ft.

The successful applicant will be responsible for the efficient operation of the works, and will assist in the supervision of the Distribution Department. He will also perform such administrative duties as are normally associated with an Assistant Engineer and Manager of a Gas Undertaking, and in the absence of the Engineer and Manager will be responsible for the management of the Undertaking.

Applicants must be chartered Gas Engineers and should possess qualifications in both Manufacture and Distribution. Experience with Continuous Vertical Retorts and Carburetted Water Gas Plant and a knowledge of high pressure Distribution is very desirable.

Salary will be in accordance with Grade XII of the Scale of Salaries for Gas Staffs (£740/£865 per annum). A house in a residential area will be available at a suitable rental.

The appointment is subject to a satisfactory medical examination and to membership of the Board's Superannuation Scheme.

Applications, giving age, details of qualifications and experience, and the names of two referees should be submitted to the undersigned so as to be received not later than December 31, 1953.

G. FITTON,
Engineer and Manager.

Gas Works,
Millands,
Neath.

NORTH WESTERN GAS BOARD

NORTH CHESHIRE GROUP

DISTRICT SERVICE MANAGER—

STOCKPORT DISTRICT

APPLICATIONS are invited for the above pensionable appointment at a commencing salary of not less than £1,000 per annum.

The person appointed will be responsible for all aspects of consumer service within the above district, including the organisation of gas installation and maintenance staffs, the control of showrooms and general administrative co-ordination.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (North Cheshire Group), Gt. Portwood Street, Stockport, within fourteen days.

OPPORTUNITY IN AUSTRALIA

THERE is an opening for a suitably qualified person contemplating emigration to Australia in the position of INDUSTRIAL GAS SALES ENGINEER with the GAS AND FUEL CORPORATION OF VICTORIA located at Melbourne.

Desirable qualifications include experience in the design, selling and installation of Industrial Gas-fired Equipment including Modern Gas Furnaces, Ovens, Tanks, Boilers, Radiant Dryers, etc.; a knowledge of Gas Heating and Hot Water Systems and Commercial Cooking Appliances would also be of advantage.

Candidates should be between 30 and 40 years of age; must be able to prepare specifications and quotations; handle general correspondence; interview clients; possess administrative capacity and ability to co-ordinate Sales Staff.

Commencing salary £1,086 (Aust.) per annum with prospect of promotion; use of car for business purposes.

Applications stating age, personal details, qualifications and experience, together with references and a recent photograph should be addressed to:

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Agents for:
GAS AND FUEL CORPORATION OF VICTORIA,
MELBOURNE, VICTORIA, AUSTRALIA.
Closing date January 9, 1954.

SOUTH WESTERN GAS BOARD

APPOINTMENT OF

DEPUTY SECRETARY AND SOLICITOR

APPLICATIONS are invited for the appointment of DEPUTY SECRETARY AND SOLICITOR from Solicitors with considerable experience of the Legal and Administrative work of a large Organisation. Previous experience in the Gas Industry is desirable, though not essential.

The salary for the appointment will be £1,500 rising by annual increments of £100 to £1,800 per annum and the commencing salary will be within this range, depending upon the qualifications and experience of the person appointed.

The successful applicant will be required to pass a medical examination and to join the Board's Staff Pension Scheme.

Applications stating age, qualifications, experience, period of notice required for terminating present appointment and giving the names of two persons to whom reference can be made, should be received by the undersigned not later than Thursday, December 31, 1953.

W. N. CURTIS,
Secretary and Solicitor.

Area Headquarters,
9a, Quiet Street,
Bath.
December 8, 1953.

EASTERN GAS BOARD

TOTTENHAM DIVISION

ENGINEERING DEPARTMENT

TECHNICAL ASSISTANT—

SOUTHGATE WORKS

APPLICATIONS are invited to fill the vacancy of TECHNICAL ASSISTANT at Southgate Works.

Applicants should have obtained the Institution of Gas Engineers' Higher Grade Certificate in Gas Manufacture or have equivalent qualifications and be experienced in the operation of horizontal retorts, water gas manufacture, water treatment, and all purification processes. Applicants should also have a knowledge of laboratory work and be prepared to control a small laboratory staff.

The successful applicant will be required to pass a medical examination and to contribute to the Board's Staff Pension Scheme.

The salary will be in accordance with Grade VIII Metropolitan (£615/£695) of the National Salary Scales for Administrative, Professional and Technical Staffs.

Applications, stating age, experience and qualifications, should be addressed to the Divisional Personnel Manager, Woodall House, 658, Lordship Lane, London, N.22, to arrive not later than Thursday, December 31, 1953.

December 7, 1953.

EASTERN GAS BOARD

WATFORD DIVISION

HOME SERVICE ADVISERS

APPLICATIONS are invited to fill two vacancies:

(1) An experienced HOME SERVICE ADVISER is required at St. Albans. She should have had at least two years' training, possess a recognised diploma, and preferably have had experience in the Gas Industry. She should be capable of taking over all home service activities in her district, including public demonstrations of cooking and home laundry, talks to women's organisations, visiting consumers in their own homes to advise on the correct use of gas appliances, judging of competitions, liaison with domestic science organisations, market survey work in consumers' homes, etc.

Commencing salary, depending on age, qualifications and experience, will not be less than £384 per annum (A.P.T. V, 'Fringe' Met.).

(2) A young lady who has completed two years' domestic science training and possesses a recognised diploma, to train as a Junior for eventual appointment as a fully qualified Home Service Adviser. In the first instance she would work from Hemel Hempstead.

Salary would be dependent on age and experience, if any.

Applications, stating age, education, qualifications and experience should be addressed to the undersigned, to be received not later than December 31, 1953.

DIVISIONAL GENERAL MANAGER.

Eastern Gas Board,
Watford Division,
Clarendon Road,
Watford,
Herts.

CHEMICAL ENGINEER or MECHANICAL ENGINEER required. Duties include planning and progressing new plant projects, and supervision of steam boilers and plant maintenance at main and branch works. Sound mechanical engineering training essential. Salary will be commensurate with experience and qualifications, of which details, including age, and present salary, should be sent to: No. 173, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

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MISCELLANEOUS

WATER-CONTENT TEST — 3 MINUTES — Already in use in the gas industry, "SPEEDY" MOISTURE TESTER gives accurate results with coal, coke and ash, and many chemicals. Needs no electricity; no skill. Portable. Write for illustrated brochure or order direct £24 10s. 0d. complete.—Thos. Ashworth & Co., Ltd., (Dept. G.J.), Basket Street, Burnley, Lancs.

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interest in a given commodity and enhances the potential of the Sales Staff. It can be used in a far more realistic way than black and white photographic prints to show off heavy machinery or a factory site. Understanding of blue-prints, service manuals, and the arrangement of complex machinery, cabling, piping, and lagging, to mention but a few examples, is made straightforward with the aid of 3-D colour slides. The foregoing remarks are addressed to the go-ahead Sales Managers, Maintenance Equipment Officers, P.R.O.s, and Publicity Managers, who are reminded that to explore a new approach and keep an open mind are pre-requisites of their job. It will not cost them more than a 'phone call or a 2½d. stamp to find out more about this medium which is an up-to-date rendering of a very old principle. Enquiries to: **Walter King Photography, 11, Bolt Court, London, E.C.4.**, who are always in the lead with the latest developments of photography. And, to firms whose policy it is to present regular pictures by means of projected slides, we have also something to offer—on 3-D lines of course!

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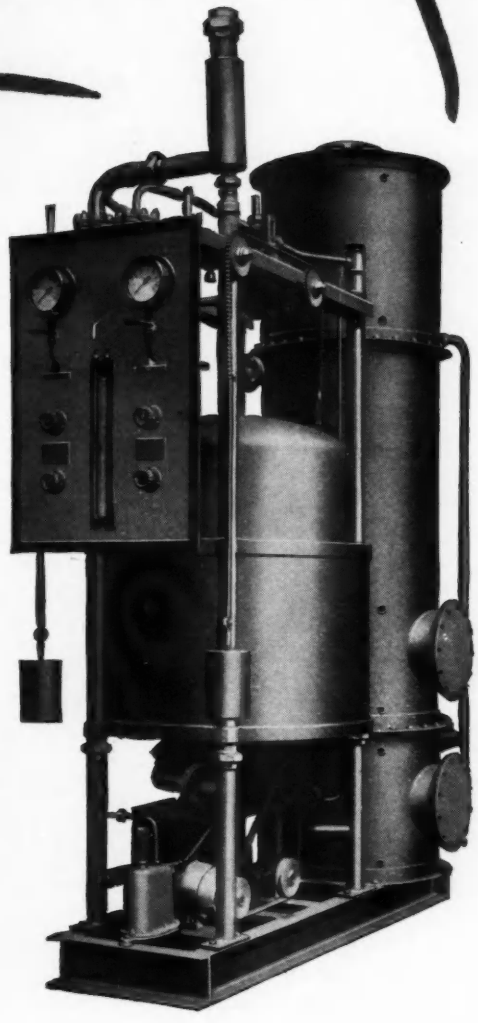
at the touch of a button!

The Holmes-Mallet Plant illustrated delivers 6-8000 cu. ft. per hour of a mixture of butane and air which can be used for domestic or industrial purposes.



ADVANTAGES

- The plant is simple and can be supervised by one operative.
- It is arranged for manual push button stop and start **or** controlled automatically from holder.
- The calorific value of the mixture can be altered to suit requirements, and will be constant at any one setting.
- The plant occupies little space.
- It is designed to comply with Government Safety Regulations.

The HOLMES-MALLET BUTANE/AIR PLANT

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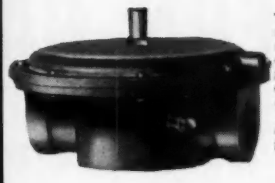
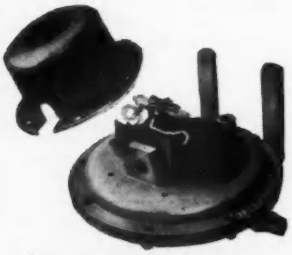
controlling gas supplies

FOR CONTROLLING THE QUALITY OF AIR/GAS MIXTURE *irrespective of varying pressures and resistances. Temperature control is varied by manipulation of the air cock only.*
CAPACITY RANGE: *from 130 to 1,380 cub. ft. of gas per hour according to air pressure (¼ lb. to 1 lb.) and size. For low pressure gas systems.*
AIR INLETS: *1", 1¼", 1½" and 2" dias. gas thread.*



THE SINGLE DIAPHRAGM AUTOMATIC SHUT-OFF VALVE *(illustrated left) automatically closes the gas supply in the event of pressure dropping below a predetermined point. Not until all burner cocks on the outlet have been shut and gas pressure restored is it possible to re-open the valve. This appliance is for operation on systems handling 150 to 2,400 cub. ft. of low pressure gas per hour.*

THE AUTOMATIC CUT-OFF SWITCH, *illustrated right, automatically breaks the electric supply to motor-driven gas boosters or compressors if low pressure gas falls below a predetermined pressure.*
RANGE: *Type 1 operates between .2" and 1.2" w.g. pressure.*
Type 2 operates between 1.2" and 5" w.g. pressure.
Type 3 operates between 5" and 15" w.g. pressure.
Additional applications include its use as (a) an air flow switch in conjunction with a flame failure device and (b) a gas meter protector.



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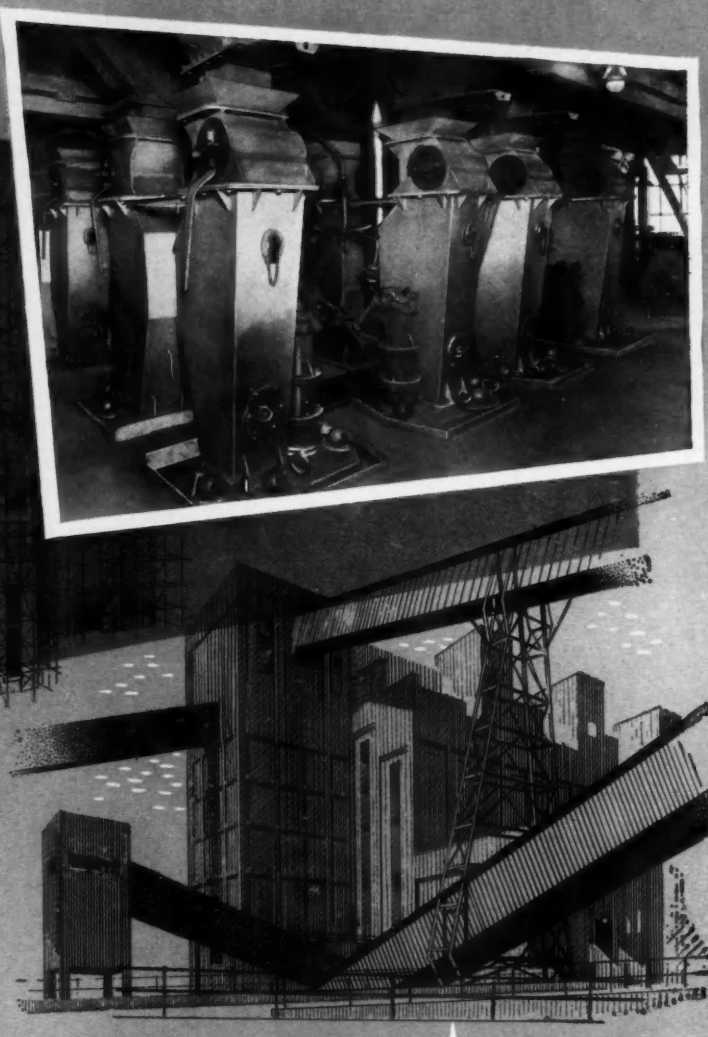
Behind the Retorts



WEST'S structural work and mechanical handling gear are integral parts of the Glover-West carbonization plant. Like the retort bench equipment, they are designed, produced and assembled by West's engineers. They make an important contribution to the efficiency of the system. In addition, they provide practical evidence of the availability to the gas industry of an experienced service in the structural and mechanical handling fields.

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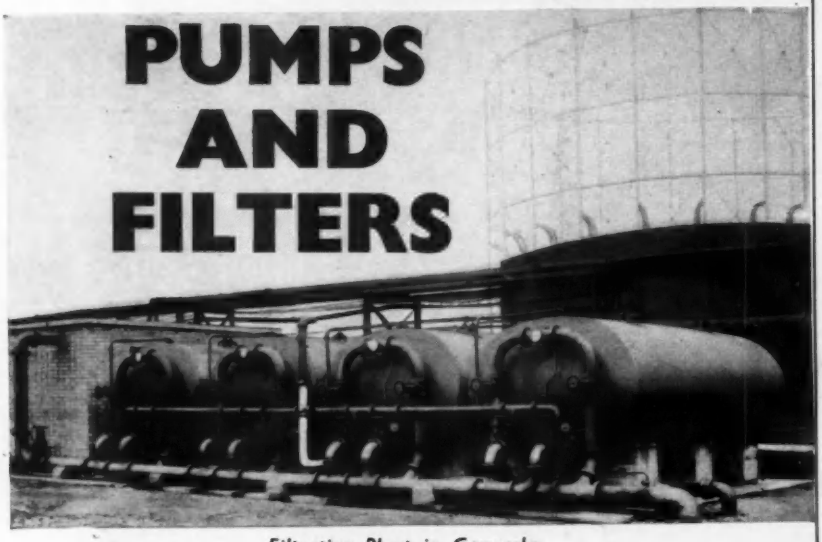
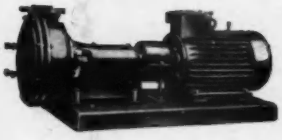


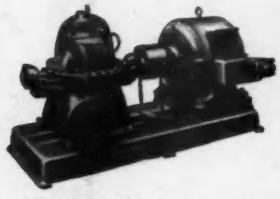
Filtration Plant in Gasworks

The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.

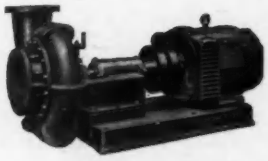
Rotary pump for Oil transfer duties



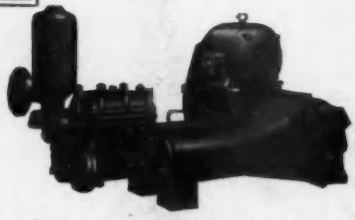
Stoneware pump for Corrosive and chemicals



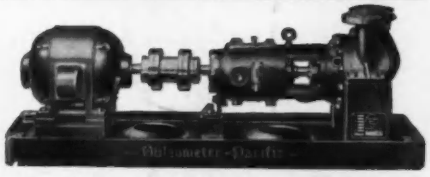
"HS" Type—for water services. All heads up to 500 feet.



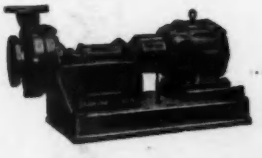
Slurry pump for coal washing and abrasive liquids.



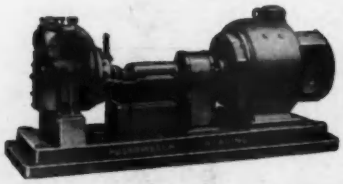
Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.



"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

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